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ABSTRACT

Whether or not to decriminalize the possession of small amounts of marijuana has been one of the most hotly debated policy issues to come onto the U.S. scene over the last decade. This study sought to determine whether decriminalization has had an effect on marijuana use in high school seniors and young adults. In 10 states, marijuana possession has been decriminalized. Using most of the remaining states as a control group, the study attempted to assess the impact of the law on the attitudes, beliefs, and peer norms of high school seniors and young adults relating to marijuana use. Two data sources were used: repeated cross sections from successive classes of graduating high school seniors and longitudinal data on several panels of individuals drawn from the high school graduating classes of 1975 and 1976. Overall, the results indicated that decriminalization of marijuana had virtually no effect either on use or on related attitudes and beliefs about marijuana use among young people in this age group. (BHK)

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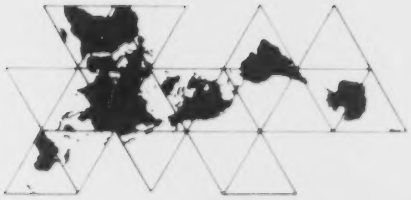

monitoring **the future**

occasional paper series

paper 13

MARIJUANA DECRIMINALIZATION: THE IMPACT ON YOUTH 1975-1980

Lloyd D. Johnston
Patrick M. O'Malley
Jerald G. Bachman

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MARIJUANA DECRIMINALIZATION:
THE IMPACT ON YOUTH
1975-1980

Monitoring the Future Occasional Paper 13

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Patrick M. O'Malley
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1981

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TABLE OF CONTENTS

	Page
Acknowledgements	ii
Introduction	1
The Meaning of Decriminalization	2
Research Objectives	3
Research Design	4
Samples of Seniors	4
Follow-up Samples	5
Measures	5
Strengths of the Present Design	6
Limitations of the Present Design	7
Results	
Part I. An Assessment of Change in Use by Seniors	10
Procedures	10
Post-Decriminalization Effects in the Early-Change States	12
Anticipatory Effects in the Late-Change States	13
Post-Decriminalization Effects in the Late-Change States	13
Adjusted Estimates of Trends in Use	14
Part II. An Assessment of Change in Use by Panels of Seniors from the Classes of 1975-1976	17
Procedures	17
Post-Decriminalization Effects in the Early-Change States	18
Anticipatory Effects in the Late-Change States	20
Post-Decriminalization Effects in the Late-Change States	20
Summary Statistics	21
Part III. Assessing the Impact of Decriminalization on Possible Intervening Variables	22
Impact on Perceived Availability of Marijuana	22
Impact on Attitudes and Beliefs About Marijuana	22
Part IV. Trends in Knowledge of the Prevailing Law	25
Summary and Conclusions	27
Figures	30
Tables	47
References	63
Appendix A: Plots of Changes for the Follow-Up Panels	65
Appendix B: Estimation of Effects of Law Change	86

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INTRODUCTION

Whether or not to decriminalize the possession of small amounts of marijuana has been one of the most hotly debated policy issues to come onto the American scene over the last decade. An entire literature is burgeoning on the subject, organizations have formed to support or oppose such changes, and many segments of society have taken a formal stand, including the American Medical Association, the American Bar Association, and Consumers' Union. We will not attempt in this report to summarize the range of philosophical, legal, political, and social issues which have been marshalled on one side of the debate or the other (see Bonnie, 1980; Hellman, 1975; National Commission on Marijuana and Drug Abuse, 1972; National Governor's Conference, 1977), since the subject of this report is not relevant to most of them. The fairly pragmatic issue which this report does attempt to address, and which appears to be a central issue in many of the debates, is whether decriminalizing marijuana will lead to an increase in use, particularly among America's young people.

The argument that it will increase use is usually derived from the assumption that decriminalization will, quite apart from any intention of the legislators, communicate to young people that marijuana use is no longer a socially discouraged behavior, and thus many will feel more free to use it. Some also argue that the removal of criminal sanctions will remove a very real incentive for not using—namely the avoidance of arrest and prosecution. The argument that it will not increase use is generally based on one or more of the following assumptions: that young people are not deterred by the existing criminal sanctions; that adult norms are not the norms of primary relevance to determining this behavior in the first place, and therefore even if they appear to change, it will have little effect; and that the illegal nature of the behavior may actually provide a positive, rather than a negative, incentive for those youngsters who are looking for ways to rebel. In fact, some even argue that the "forbidden fruit" quality given to marijuana by its illegal status increases use and, therefore, that the removal of this status may actually reduce youthful marijuana use.

Our own hypothesis for some years now has been that use of the drug by young people in their teens and early twenties will either be unaffected or affected in negligible degree by decriminalization. We came to this prediction largely through inferences made from related facts provided by young people themselves. First, since 1975, very few high school seniors in each graduating class have felt that their own use would be affected by complete legalization of possession and sale (Johnston, Bachman, and O'Malley, 1977, 1980a). Presumably, decriminalization (not legalization) of possession only would have even less impact. Second, we know that marijuana use has not been a negatively sanctioned behavior among peers for this age group (Johnston, et al. 1977, 1980a). Since we believe peer norms to weigh more heavily than adult norms (Kandel, 1973), even if there were a perceived change in the latter, we would guess its effects to be minimal. Further, we were not convinced that decriminalization would be taken as a signal of adult or official acceptance of marijuana use. Third, we knew that marijuana availability already

was such that nearly all young people in this age group felt that they could gain access to marijuana if they wanted it (Johnston, et al. 1980a). Thus decriminalization of the possession of small quantities seemed unlikely to change the important facilitating condition of availability. Finally, fear of arrest did not seem to be a central concern among the segments who were not using (abstainers and quitters). (See Johnston and Bachman, 1980; Bachman, Johnston, and O'Malley, 1980a & b; Johnston, Bachman, and O'Malley, 1980b & c.) All of these factors in combination led us to expect little or no effect from decriminalization. Still, the matter clearly needed to be addressed empirically and in a scientific and balanced manner.

In 1976 we suggested to the National Institute on Drug Abuse that the scattered occasions of decriminalization taking place in various states around the country constituted a set of "natural experiments" which would be worthy of careful evaluation for the purpose of answering this question. The Monitoring the Future project had just begun its annual surveys of high school seniors nationwide the year before, and we proposed supplementary funding (for augmented samples in decriminalizing states and for additional analyses), to permit an evaluation of (a) some of the natural experiments already known to have occurred (i.e., in California, Maine, Minnesota, Ohio), and (b) some others yet to occur. Funds were granted to do this work, and the samples of seniors and later follow-up respondents in three states (California, Maine, and Ohio) were supplemented. Three additional states from which we had schools in our national sample decriminalized marijuana possession in July of 1977: New York, North Carolina, and Mississippi.

It was serendipitous for analysis purposes that the first group of states—referred to hereafter as the "early change states"—all had their decriminalization go into effect between the 1975 and 1976 data collections, which occurred in late March through June.* (See Figure 1.) The other three states, which we will call the "late change states," all had their new legislation go into effect between the 1977 and 1978 data collections. Thus it is possible to treat the decriminalized states as two groups for many analysis purposes, early-change and late-change. Before proceeding with the research plan, however, let us review for a moment the meaning of the legal phenomenon under study here—marijuana decriminalization.

THE MEANING OF DECRIMINALIZATION

Until the early seventies, possession of even small amounts of marijuana was a criminal offense in virtually all states; but during the seventies a number of states, following the recommendation of the National Commission on Marijuana and Drug Abuse, enacted statutes to "decriminalize" possession of limited amounts. While the specifics of what is meant by "decriminalization" vary somewhat from state to state, there are certain commonalities (Bonnie, 1980). Most important, a jail

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*Minnesota, which accounts for relatively few of the total cases in the early-change state sample, actually changed the law on April 1, 1976—about the time that the two schools were surveyed.

sentence is no longer a penalty option for someone apprehended with a limited quantity of marijuana in his or her possession, for a first offense at least. (The quantity limitation was imposed to help differentiate users from sellers, and for most states it is defined as one ounce of marijuana.*) In some states the possession of even smaller amounts of hashish has also been decriminalized.

Possession of such limited quantities in some decriminalized states is categorized as a civil violation or offense punishable by civil fine (Maine, New York, Mississippi, Alaska), a misdemeanor or minor or petty misdemeanor (California, Ohio, Minnesota, North Carolina), a petty offense (Colorado), or a violation (Oregon). In six of these states a police officer can issue a citation but not arrest the offender, while in the other four (Ohio, Maine, Minnesota, North Carolina) there is no specific provision on this count. Court appearance is mandatory in some states (California, New York, Oregon, Colorado, Mississippi) while in others it is not. In all states except two (Maine and Mississippi) the fine for a first offense is limited to $100 or less. Except in California (where the record is expunged after two years) and North Carolina (where there is no specific provision regarding the record), there are no records made of the offense. For second and subsequent offenses, five states give courts the option of more severe penalties, while the remaining five do not. (See Bonnie, 1980, for more details.)

These legal conditions contrast rather sharply to those prevailing in the remaining states, virtually all of which provide some time in jail (up to one year in most states, but ranging up to six years in at least one) as an option for sentencing. Most also permit sizeable fines, and arrests and convictions result in permanent records for the offenders. Since most of the decriminalized states had similar statutes prior to decriminalization, the potential legal consequences of being apprehended with limited quantities of marijuana have shifted considerably as a result of the law change. Of course, while harsh statutes may exist on the books, law enforcement officials and judges may or may not choose to enforce them—which has a lot to do with any change in the perceived probability of arrest and of the perceived consequences likely to result in the event of arrest (Johnston, 1983). Since in this study we have not gathered data on enforcement and sentencing policies, either before or after decriminalization, we cannot make the kinds of refinements which might be ideal for quantifying the degree of change. We treat decriminalization here as a homogeneous phenomenon. Clearly in none of these states is decriminalization tantamount to legalization. Rather it is a downgrading of the seriousness and consequences attached to possession of limited quantities, particularly in the case of a first offense in many states.

RESEARCH OBJECTIVES

The first and foremost objective of this research project is to determine whether decriminalization has had an effect on marijuana use in the population under study, high school seniors and young adults. The data are clearly not sufficient to address the same question for younger or older age groups; however, given that marijuana use tends primarily to rise throughout the high school years

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*In New York and Ohio the limitation is stated in grams, but translate to approximately eight-tenths of an ounce and 3.2 ounces, respectively.

(Johnston, Bachman, and O'Malley, 1980a), one would expect any lasting impact on younger age groups to have shown up in higher prevalence rates among seniors in the early-change states by 1980, the last year encompassed in the present data set. We should also point out that a segment of each age group, namely the 15% to 20% who fail to finish high school, is omitted from this study. It seems unlikely, though, that any effect of decriminalization would be substantially different for seniors than for their age mates who have left school early.

The second objective of the study was really contingent on the outcome of the work on the first. If an appreciable rise in marijuana use were found to be associated with decriminalization, then the next research question would be: do any of a number of known correlates of marijuana use also change? If no change in marijuana use were found to result, the next research question would be: do any variables which might intervene between the law change and eventual behavior show an impact from decriminalization—such things as attitudes and beliefs about the drug, peer norms regarding use, and perceived availability. If so, such changes could portend a longer-term gradual change in use.

RESEARCH DESIGN

The basic research design of the Monitoring the Future study is a cohort-sequential design (Schaie, 1965; Labouvie, 1976): that is, one in which multiple cohorts (graduating classes in this case) are followed over time.* Beginning in 1975, a nationally representative sample of each year's senior class in public and private high schools in the coterminous United States has been surveyed. Self-administered, machine-scored questionnaires have been completed by some 15,000 to 18,000 seniors per year located in approximately 130 high schools. Each spring questionnaires are administered in classrooms by trained, professional interviewers from the University of Michigan's Institute for Social Research, and they take approximately one class period to complete. Participation is voluntary and extensive measures are taken to assure confidentiality.

Samples of Seniors

A three-stage sampling procedure is used to secure a nationally representative sample of seniors. Stage 1 is the selection of particular geographic areas around the country; Stage 2 is the selection of one or more high schools within each area; and Stage 3 is the selection of seniors within each high school, if the senior class exceeds 300 to 400 students in size. Random sampling procedures are used at all stages, sometimes with stratification to improve accuracy. Schools are generally invited to participate for two years, thus half of the school sample is replaced each year. In essence, each year's sample is actually comprised of two nationally representative half-samples, one of which participated in the prior year and the other of which will participate in the subsequent year. Depending on the year, from 66% to 80% of the new half-sample of schools invited to participate agree to do so; and nearly all of

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*A more complete description of the study design may be found in Bachman and Johnston, 1978; or in Johnston, Bachman, and O'Malley, 1980.

those remain in the study for the second year. For each school refusal, a similar school (in terms of size, geographic area, urbanicity, etc.) is recruited as a replacement. The resulting senior samples for the parent study (excluding special supplements) are summarized in Table 1.

For the purposes of the present report we want to conduct analyses on matched samples of schools. This two-year school participation cycle set certain limits on the types of repeated cross-sectional analyses of senior data which could be conducted, since generally schools can be matched with themselves only across a one-year interval. As a result, our analyses of possible decriminalization effects on seniors are conducted separately for each one-year interval, with the underlying samples of schools for the most part being independent for each such interval and amounting to only half of the number of schools that participate in the study in a given year.* Table 2 gives the sample sizes for the matched half-samples of schools which will be used in these analyses.

Follow-Up Samples

With the use of a stratified, random sampling procedure, a subsample of the participants from each year's senior class has been selected for mailed follow-up surveys in the years after high school. Every year since 1976 such a panel for each of the previously participating senior classes has been surveyed. Longitudinal panels from two graduating classes will be used here: the class of 1975 (a panel which was supplemented in the early-change states) and the class of 1976. In fact multiple panels from each of these classes are used as will be described further below.

Two strata are used in drawing these subsamples for panel participation. One consists of those who in senior year report using marijuana on 20 or more occasions in the prior month or using any other illicit drug at least once in the prior month: this stratum, which usually comprises 10% to 20% of the seniors, is oversampled (that is, disproportionately represented in the follow-up panel). The second stratum is comprised of all other participants, i.e., those less involved in drug use; and they are sampled with a lower probability (generally, one third the probability of the first stratum). Corrective weighting is then used in calculating data from the panel, with the oversampled stratum getting only enough weight per case (usually 1/3) to give the entire stratum its proper proportion of the total weighted cases. Thus, the weighted N's in the panel analyses are lower than the actual N's, and it is the former which have been used in all statistical tests.

Measures

Five different questionnaire forms are used both in the senior year (hereafter referred to as base year) and in the follow-ups. These forms are distributed randomly among the seniors, and those who remain in follow-up panels receive the form which matches their base year form. All five forms contain a common core section of demographic variables and drug-use questions. A few variables analyzed

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*This is less true in the early change states from 1975 to 1978, when a number of schools consented to remain in the study in order to supplement our samples in those states.

here (dealing with attitudes and beliefs about marijuana) come from a single form; but the key variables for this report are the marijuana usage questions, which are contained in the common core in both base year and follow-up. There is a general stem which leads up to three separate questions: "On how many occasions (if any) have you used marijuana (grass, pot) or hashish (hash, hash oil)..." The first question has the closing "...in your lifetime?", the second, "...during the last 12 months?", and the third, "...during the last 30 days?" For each of the three questions the respondent must select from a closed-ended set of bracketed frequency categories which read as follows: "0 occasions, 1-2, 3-5, 6-9, 10-19, 20-39, or 40 or more."

To clarify terminology to be used in the following sections, "lifetime prevalence" refers to the percent of a sample who indicate use of marijuana on one or more occasions during their lifetime, "annual prevalence" refers to the percent who indicate use on one or more occasions in the past twelve months, and "monthly prevalence" means use on one or more occasions in the prior thirty days. "Daily prevalence" is defined as use on 20 or more occasions in the prior 30 days.

A "frequency of use" index, with a scale ranging from two to eleven will also be used. It is a measure of frequency of recent use and is derived from the answers to the annual and thirty day marijuana use questions. (See Bachman, O'Malley, and Johnston, 1979, for details on the development of this measure.) Its scale points are defined as follows:

2. No use during last 12 months
3. Used 1-2 times during last 12 months
4. Used 3-5 times during last 12 months
5. Used 6-9 times during last 12 months
6. Used 10-19 times during last 12 months
7. Used 20-39 times during last 12 months
8. Used 40 or more times during last 12 months, but fewer than 10 times during last month
9. Used 40 or more times during last 12 months, and 10-19 times during last month
10. Used 40 or more times during last 12 months, and 20-39 times during last month
11. Used 40 or more times during last month

The frequency of use index is helpful because it provides a kind of summary measure which incorporates the variance contained in the annual prevalence and monthly prevalence measures, but also because it provides a more sensitive measure of frequency than monthly or daily prevalence provide. It could be argued that decriminalization may not have an effect on the proportion of people who use (measured by annual prevalence, for example) but may have an effect on the frequency with which users take the drug.

Strengths of the Present Design

Several desiderata for research on the effects of marijuana decriminalization, suggested in an earlier paper by Johnston (1983), are met in the current design. First and foremost is that the design provides comparable "before" as well as "after" measures of drug use in relation to the point of decriminalization. Campbell and Stanley (1963) use the phrase "interrupted times series" to describe a before and

after repeated measurement of this sort which can be used to assess the impact of an intervention. Further "before" and "after" measurements are available not only in the experimental or treatment states but in a sizeable sample of non-treatment or control states, as well. Second, the possibility that there might be some "anticipatory effect" preceding the actual law change—perhaps as a result of increased public attention being focused on marijuana use, or as a result of public discussion of impending change somehow communicating official legitimation of use—is a possibility which can be addressed in the current data, since in the late-changing states we have trend data beginning approximately two years before the enactment of the laws. Third, the possibility of there being a "lagged effect" which would not show up in the first year or so after the law change also can be addressed, since we have trend data covering approximately four to five years after the early decriminalizing states changed their laws (in 1975 and early 1976) and for nearly three years after the late-decriminalizing states changed their laws (in 1977).

Fourth, we are not forced to try to generalize from a single state, as is more typically the case, with whatever idiosyncracies may exist in its particular situation. There are seven decriminalized states from which our treatment data derive, though not in equal proportions, which should give greater stability and generalizability to the results. They also provide considerable diversity in terms of region and degree of urbanization. The early-change states include California, Maine, Ohio, and Minnesota. The late-change states include New York, Mississippi, and North Carolina.

The fifth desideratum concerns numbers of cases upon which the results are based. Compared with most past research on the subject, we have relatively large numbers of cases, particularly in the samples of seniors. (The follow-up samples are considerably more modest in size.) A special effort was made with funds from the present grant to supplement the number of cases in both the senior year samples and the follow-up samples (in 1976, 1977, and 1978) in the early-changing states, in order to increase the power of the analyses. In the case of senior year data, a number of schools which would normally have cycled out of the study at the end of their agreed-upon two-year participation consented to remain longer. In the case of the follow-up participants, the standard panels from the class of 1975, in three of the early-change states (California, Ohio, and Maine) were supplemented to include all of the remaining seniors from those states who participated in the 1975 senior survey. The results of these 1975 through 1978 supplements can be seen in the N's given in Table 2.

One final advantage of the present design is that two types of relatively independent data can be brought to bear on the subject: repeated cross-sectional data from high school seniors, and longitudinal data on two senior class cohorts entering their twenties during the five-year historical period under study. To the extent that these two lines of analysis converge in their results, we can be all the more certain of the validity of those results.

Limitations of the Present Design

While the present research design contains a number of features which are desirable for the task at hand—namely, assessing the impact on young people's marijuana use of decriminalizing posession of small quantities of the drug—it also has some limitations.

For one, the sampling design of the present study was never intended to generate samples which would be representative of particular states and, therefore, the available samples are not.* Thus, it would be inaccurate to make generalizations about the population of an entire state from any of the state level data connected with this report. For the purposes of the current analyses, however, this limitation is less important—particularly given that a number of decriminalized states are included—since our change analyses focus on the same, albeit non-representative segment of the population in each state across time. To illustrate, in the case of the high school seniors being compared with seniors in later classes, we only make comparisons with seniors from the same schools at a later point in time, i.e., the schools are matched. In the case of the longitudinal panel analyses, the person serves as his/her own control or match, in the sense that the same person is providing both the "before" data and the "after" data. Nevertheless, had we been designing the study from the outset to address the current research question, it would have been more ideal to start with representative samples at the state level.

A second limitation of the design relates to the numbers of cases available for analysis. While this study generally uses large N's, comparatively speaking, the N's are not large for all groups or all years. For the late-changing states, for example, the number of seniors available for the 1975-1976 and 1979-1980 comparisons are quite limited (see Table 3).

For the longitudinal analyses based on the panel of seniors from the class of 1976, the N's are limited throughout, since it was not part of the design to supplement that panel. For panel analyses based on the class of 1975, the N's drop sharply after the 1977 follow-up. This drop was due to two unrelated factors: the fact that the grant provided for supplementing that panel only in 1976, 1977, and 1978, and the fact that the follow-up procedures for the parent project were changed substantially in 1978. These changes in procedure were made to improve lagging response rates in the follow-ups. One change involved paying respondents five dollars, the cost of which necessitated a considerable reduction in sample size. The other change was to move from an annual data collection from each panel to a bi-annual collection from each of two matched half-panels—with the one half-panel being surveyed on odd years and the other on even years. The purpose was to reduce demands on respondents. Therefore, for the class of 1975 the follow-up panel surveyed in 1978 and 1980 is completely independent of the one surveyed in 1979. And both have only a partial overlap with the larger panels surveyed in 1976 and 1977, partly because the response rates were lower in those earlier years.

After 1977 the response rates generally exceeded 80% of the original target panel, which was drawn from those who participated in senior year (using a stratified random procedure). Prior to 1977, the response rates ran around 65% for the first year after high school and (in the case of the class of 1975) below that in the second

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*Because the larger design does generate a random sample of high school seniors at the national and regional levels, all types of communities and students should fall into both the "treatment" and "control" states—that is, rural and urban schools, high and low socioeconomic status, various racial compositions, and so forth. Therefore, in the aggregate there should be no systematic bias in the samples; rather, they have not been designed to guarantee representativeness on all of these dimensions at the state level.

year. While we think that overall drug use rates may have been understated somewhat in those lower response-rate years, there is no reason to believe that the underestimation should have affected the decriminalized and non-decriminalized states differentially. The findings presented below tend to confirm that assumption. But, as a result of the changing composition of these panels across follow-up years, we judged the best approach to be to analyze the different panels separately, which is what we have done.

Another design limitation—one which exacerbates the limited N problem, particularly in the senior year data—is that the students are not sampled independently from all seniors in the universe, but rather in clusters by school. Using a clustered sample is a highly cost effective technique and permits the acquisition of the large N's in this study in the first place. However, an N of say 1,000 cases in a clustered sample may give the same sampling accuracy as perhaps only 700 independently sampled students. This type of discounting is referred to as the "design effect" resulting from a clustered design (Kish, 1965). Because the design effect increases as a function of the number of cases per cluster, it is greater in the case of our senior year data, where we have many students per school (averaging around 110), than it is in the follow-up panels which are based on relatively few students per school. (The supplemented panel in the early-change states for the class of 1975, followed up on 1976 and 1977, is an exception since all seniors were followed.) Because a clustered design yields a lower effective N than the actual number of respondents, it obviously takes a somewhat larger difference between groups to be statistically significant.

RESULTS, PART I

An Assessment of Change in Use by Seniors

Two separate lines of analysis will be pursued in the results section; one deals with change from year to year across successive classes of high school seniors, and the other deals with longitudinal change for panels of seniors representing the graduating classes of 1975 and 1976. We begin with an assessment of change in use across senior classes.

Procedure

As described earlier, schools and the students they contain are separated for analysis purposes into three mutually exclusive groups—those in the early change (decriminalizing) states, those in the later change states, and those in all other states contained in the study (none of which had decriminalized by 1980). The various measures of marijuana use—namely, lifetime prevalence, annual prevalence, monthly prevalence, daily prevalence, and the frequency-of-use index—have been traced across the time interval 1975 to 1980 for these three groups, as presented in Figures 2 through 11. Because the sample of schools participating in the study shifts from year to year, the three different classes of states are represented by a somewhat different panel of schools across each one-year interval. Therefore, the lines across the five years are discontinuous, indicating that the early-change states, for example, are represented in the 1975-1976 interval in Figure 2 by a panel of schools which has a slightly higher mean level of marijuana use in 1976 than the panel representing those same states in the 1976-1977 interval. As was discussed earlier, it would have been preferable to follow the same schools throughout, but the study design did not permit that. As a result, each one-year interval has to be assessed separately to determine whether there is any convincing evidence of differential amounts of change among the three classes of states, and then an overall assessment must be made of whether there is convincing evidence of a consistent or cumulating pattern of differential change over five years.*

Throughout, the emphasis will be on pairwise comparisons of (a) the amount of change in the early-change states vs. the amount in the control states, and (b) the amount of change in the late-change states vs. the amount in the control states. We will speak of "net gains" on the control states, which could result from the experimental group having either a greater increase or a lesser decrease than the

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*Concern about the possible effect of shifting response rates within schools led us to rerun a sample of the analyses presented in this section leaving out schools whose response rates shifted appreciably from one year to the next. The resulting plots turned out to differ only negligibly from the ones presented here.

controls. The net gain or loss is calculated as a simple difference: the mean change value on the experimental group minus the mean change value on the control states.* (Where prevalence figures are under discussion, the mean change value actually represents the change in percent using.)

In essence, this analysis procedure treats parallel movement on the absolute scale for marijuana use as indicating no differential change; that is, such movement would show up as no net gain or loss. Thus absolute differences in starting points for each one-year interval are accepted as representing real differences in marijuana use among the three groups of states (or, more correctly, among the special samples from those three groups).**

Naturally, one expects to observe some differential change between groups simply due to sampling and/or measurement error. The question is whether it is more than might easily have occurred by chance—that is, how statistically significant is it—and, perhaps more important, does it fit into a consistent pattern across time? For example, looking at lifetime prevalence of marijuana use, we might observe a relatively small (and perhaps not statistically significant) net gain of 1% on the control states by the early-change states in a given year. If this change is part of an erratic up-and-down pattern across the five years, it is very likely due to random error, and in any case is of no substantive importance. On the other hand, if it is part of a consistent pattern of 1% annual net gains, it is far more believable; furthermore, the resulting 5% net gain in lifetime prevalence across five years may be seen by some, at least, as beginning to amount to an impact of some substantive importance. Thus the pattern of change and, particularly, the degree to which it appears to be cumulative, is of greatest significance.

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*In calculating the group means for each one-year-interval, we assigned the mean scores for each school (at both the beginning and end of the interval) a weight equal to the smaller of the two samples of seniors surveyed in the two graduating classes. Thus each school weighs into the earlier and later group mean in equal proportion, and the same number of total cases appears for both time points.

**In the tables and figures discussed in this section, the following conventions have been used in weighting the individual level data. In the early-change-states and late-change-states individuals all received equivalent weights of one. In the large control-state samples, individuals received the base-year sampling weights assigned to them for national sample estimates: these correct for disproportionate representation at the various stages of sampling. We felt these weights would yield the most appropriate representation of the remainder of the country; however, they would not be appropriate for use in the experimental states, since they have little to do with yielding a representative sample at the state level.

We did have a concern, given the wide variation among schools in number of participants, that results could be overly influenced by the large schools. Since accuracy of estimates tends to increase as a function of the square root of N, all analyses in Tables 3 through 7 were repeated (results not presented here) using the square root of N as a weight for each school's data. While particular numbers in the results tended to increase or decrease very slightly, the overall results presented below were really not affected in any systematic way. Thus, we can be relatively sure that these results are not seriously affected by disproportionate clustering by school.

Post-Decriminalization Effects in the Early-Change States

Recall that in all the early-change states the possession of limited quantities of marijuana was decriminalized between the first and second data collections (i.e., between spring of 1975 and spring of 1976). Thus it is not possible to encompass any anticipatory effect unless it occurred within the few months immediately prior to decriminalization. However, a sizeable, four-to-five-year post-change period is encompassed. (The possibility of anticipatory change will be addressed using the late-change states.)

To determine whether decriminalization appears to increase the proportion of young people who at least try marijuana, we begin by comparing changes in lifetime prevalence for the early change states vs. the control states ("other states"). A visual examination of Figure 2 shows little evidence suggesting net gains by the early-change states (the net gains and losses are quantified in Table 3). Taken in sequence, early-change states show a small net loss in the first, third, and fifth years (-2.0%, -0.7%, -2.2%), a small net gain in the fourth year (+1.5%) and a negligible net gain in the second year (+.5%). If one sums across these gains and losses to get a rough sense of whether across the five years the early change states are gaining in use relative to the control states, one gets a 2.9% cumulative net loss. In other words, lifetime prevalence in the early change states, which have generally tended to have the higher prevalence levels, did not increase as much as did the non-decriminalized states during a historical period in which rates were generally rising (Johnston, et al., 1980a). From these data one might try to make a case for a negative impact from decriminalization (that is, that it reduces use), but would be hard pressed to make the case for a positive impact.

Of course, one could still argue that even if the overall proportion of young people using is unaffected, the currency or frequency of use by the segment which is using could be affected by decriminalization. That brings us to a consideration of our measures of more current prevalence (annual and monthly) and of frequency (daily use in the previous 30 days and the overall frequency-of-use index). Cross-time trends in these measures for the early-change states vs. the control states are presented in Figures 3 through 6, and the data are summarized in Tables 4 through 7. Again the story is one of mixed gains and losses in different years relative to the control states. (In the first two years, there is even a mixture of net gains and losses across different of the prevalence and frequency measures themselves, which are highly correlated with each other, of course.) Overall, the story appears to be one of parallel movement by the early-change states across time, with occasional fluctuations up or down, but with no consistent pattern of net gains or losses relative to the control states. Summing the net gains and losses across the five years yields an overall rough measure of the cumulative gain or loss: for the early-change states there is a net gain in annual prevalence of 0.2%, an overall net loss in monthly prevalence of 1.8%, an overall net loss in daily prevalence of 0.3%, and an overall net loss on the mean frequency index of .025 points (on a two-to-eleven scale). These are very small changes, whether stated in absolute terms or as proportions of standard deviations (see Tables 4 through 7 for standard deviations).

All in all, the largest and, therefore, most reliable body of data on which we can test for possible effects of decriminalization shows no convincing evidence of any positive effect on either lifetime prevalence rates, or frequency or recency of use. If anything, there was a small net loss in lifetime prevalence and an even smaller net loss in frequency, relative to the control states, over a full five-year interval.

Of course, it still might be argued that there was an "anticipatory effect" which only would have been demonstrable had we collected data one or two years prior to when the decriminalization statutes were put into effect. While we cannot empirically address that point for the early-change states, we can for the late change states, which brings us to the next set of analyses.

Anticipatory Effects in the Late Change States

The interval 1975 to 1977 comprises a substantial amount of the time period immediately preceding decriminalization in the late-change states (New York, Mississippi, and North Carolina). The remaining few months before decriminalization are captured in the first part of the 1977 to 1978 interval. Figures 7 through 11 and Tables 3 through 7 present the various usage rates and changes in usage rates for this pre-change period, as well as for the post-change period. What they seem to show is that over this two-year anticipatory interval there is for the most part parallel movement with the control states across the various prevalence and frequency measures. Summing net gains and losses across the two years, for lifetime prevalence we get a cumulative net loss of 1.4%, for annual prevalence a gain of 2.3%, while there is a negligible net gain in monthly prevalence of 0.4% and a net loss of 0.9% in daily prevalence. The overall frequency-of-use scale shows a small .069 drop on its 2 to 11 scale. Again, these are all very small changes and mixed in direction across both the two years and the five measures. There is certainly no convincing evidence here of any anticipatory effect, since three of the five observed changes were in the direction of a net loss relative to the control states.

While this does not preclude the possibility that there was an anticipatory effect in the early-change states, but not the late-change states, such a hypothesis is hardly very parsimonious. Further, given the fact that the 1975-1976 measurement interval in the early-change states actually included a substantial number of months prior to the change, any near-term anticipatory effect should have shown up in those data, and none did. Thus the seemingly reasonable hypothesis that some or all of the impact of decriminalization on marijuana use might occur before the new law actually goes into effect (due to increased attention, symbolic legitimation, and/or ambiguity about the effective date) draws no support from the present body of data on high school seniors.

Post-Decriminalization Effects in the Late-Change States

While the early-change-state data are by far the more reliable, given their larger number of participating schools and students each year (see Tables 3 through 7), it is still worth considering whether the smaller samples from the late-change states tend to replicate the results of the early-change states for the post-decriminalization period. A two-to-three-year post-change interval (depending on the exact date of decriminalization) is covered in the 1977 to 1980 data collections.

Referring again to Figures 7 through 11 and Tables 3 to 7, we see that the patterns for this period are not as smooth as were observed in the early change states (as would be expected, given the sample sizes); nevertheless, they tell much the same story. Summing over the three-year interval (1977 to 1980) yields net losses relative to the control states for lifetime prevalence (-1.7%), annual

prevalence (-1.0%), and monthly prevalence (-1.6%). It happens that all three of these measures showed very limited net upward shifts in the year of decriminalization (.6%, 1.7%, and 3.7% respectively); however, steady declines in each of the two successive years more than offset them.

The relative gain/loss score in daily use, which is particularly volatile for the late-change states (Figure 10 or Table 6), did show a net increase of 4.4% across the three-year interval. However, as Figure 10 shows, the pattern is not a consistent one across that period: daily use showed a net gain in 1977-1978, a net loss in 1978-1979, then a net gain again in 1979-1980. We are inclined to almost entirely discount the 1979-1980 net gain (which contributes 2.4% to the cumulative net gain) for two reasons: first, a more detailed examination showed that it is due to (and observed in) only one of the four schools participating that year; additionally, it is not paralleled in any of the prevalence measures, as would normally be expected. In fact, the overall frequency-of-use index increased that year only a very slight .067 on its 2 to 11 scale (or about one-fiftieth of a standard deviation). The 3.2% net increase in daily use in the year of decriminalization (1977-1978) is harder to discount, since monthly prevalence shows a parallel net increase. As stated earlier, the figures for net gain or loss in daily use seem particularly volatile for the late-change states, with swings of two to three percent occurring in three of the five years covered (vs. in none of the years for the early-change states). Therefore, this particular swing may well be due to chance factors.* Someone could also argue, however, that while decriminalization did not seem to increase the proportion of seniors using, even in the year of decriminalization, it did increase for a short time (less than a year) the frequency with which the "users" used. There is some limited evidence here to support such an interpretation, though the fact that no similar effect was demonstrated for the larger and more reliable sample in the early-change states seems directly inconsistent with it.

Over the longer term, however, the preponderance of the evidence from the late-change states appears to be quite consistent with that provided by the early-change states. Overall the measures from the late-change states fairly closely parallel those from the control states, with actually a slight net drop in the three prevalence measures relative to the control states and a very slight net increase in the overall frequency-of-use index (up .005 on a 2 to 11 scale or about a fiftieth of a standard deviation).

Adjusted Estimates of Trends in Use

We discussed in the preceding section the complexities of analyses based on matched sets of schools, and the figures presented in this chapter reflect some of those complexities. We think that much of the uneveness which appears in Figures 2 through 11 is due to sampling fluctuations. The numbers of schools are limited, particularly in the category of late change states; consequently, base-rate differences in marijuana use from school-to-school can displace the trend lines upward or downward as we move from one one-year interval to the next. Given that our procedure "matches" each school with itself across a given one-year interval, we

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*An examination of changes for each of the twelve late-change schools contributing data that year shows that the change is not due entirely to one or two schools, as was true in 1979-1980.

would expect sampling fluctuations to have more effect on the height of the various line segments than in their slopes. A review of the figures in this chapter seems, on the whole, to confirm such expectations.

Having completed a detailed review of the tables and figures provided thus far in this chapter, our purpose now is to provide a more simplified display of trends in law change states versus control states. Our strategy is to rely on the relative change data (i.e., the slopes) included in the earlier figures and tables, but to make adjusted estimates of the overall heights (and shapes) of the trend lines so that they will be continuous, rather than segmented. This involves three steps: (1) establishing a best estimate of a continuous trend line in marijuana usage for the control states; (2) estimating the cumulating gains/losses for early-change states, and for late-change states, relative to control states; and (3) estimating a "starting point" for the early and the late-change states, which in turn determines the overall height of their trend lines. We review each of these steps below; then we apply the procedures to the annual prevalence measure, and to the frequency index (the two-to-eleven scale).

1. As a best indicator of the trend line for control states, we computed scores for all seniors (weighted) in all states which did not involve law changes; in other words, we used exactly the same sort of procedure as in our national reports on drug use trends (e.g., Johnston, Bachman, and O'Malley, 1980a), except that the early and late law change states were excluded. This overall trend line for control states is based on the full annual samples is very similar, but not identical, to the control-states data for the matched half-samples of schools provided in the tables in this chapter; however, the overall trend line provides a slightly more accurate representation of the nation as a whole (omitting the law change states, of course).

2. Our best available estimates of relative gains/losses for marijuana law states relative to control states are those contained in the figures and tables presented earlier in this chapter. Recall that this procedure involves each school being matched with itself one year later, thus largely controlling for the random variations that occur when particular schools move into and out of the samples. It was necessary for present purposes to compute cumulative measures of relative gains/losses. Part of the rationale for this cumulative approach is that random fluctuations in trends from one year to the next will tend to cancel each other, whereas any general upward (or downward) tendency will emerge more clearly. The cumulative estimates of relative gains/losses are derived in a straightforward manner from the gain/loss data included in the previous tables. Thus, for example, the cumulative gains in annual prevalence in early-change states (derived from Table 4) are 1.6% as of 1976, 2.2% as of 1977 (the result of adding the 1976-77 gain of 0.6% to the 1975-76 gain of 1.6%), 0.7% as of 1978, 4.6% as of 1979, and 0.2% as of 1980. The above cumulative gain scores indicate the ways in which annual prevalence scores for early-change states are estimated to depart from a line which is perfectly parallel with such scores for the control states.

3. The two above steps provide us with an overall trend line for control states, and estimates of cumulated relative gains (or losses) for early-change states, and for late-change states. What remains to be done is to find appropriate "starting points" for the two sets of change states. A review of the tables and figures presented earlier in this chapter suggests that the early-change states generally showed sightly higher levels of marijuana use than the control states—a pattern observed (somewhat unevenly) throughout the five-year interval under study. Thus it

appears that, among all schools which fell into our samples over a number of years, those from early law change states averaged slightly higher in use than those from states which experienced no law change. We have cautioned earlier that we do not have what can be called representative samples in the law change states; therefore, we cannot make an overall estimate about whether the law change states as a whole are above or below the national averages in marijuana usage. Nevertheless, the fact that the slight differences appear somewhat consistently in our samples suggests that we should incorporate it in our summary description—if only because it does provide a reasonably good way of characterizing those schools which appeared in our samples, and thus also provides a close correspondence between the new displays and our earlier figures. The procedure for calculating the appropriate start point for the early-change and late-change lines, is to take each set of schools in each year as providing a separate estimate of the initial (i.e., 1975) differences between each group of law change schools (overall) and control schools (overall). For the 1975 data collection this estimate consists simply of the differences between the means shown in the tables (e.g., for annual prevalence, shown in Table 4, the mean for early change schools in 1975 was .463, the mean for control schools was .380, and the difference was .083 or 8.3%). For later data collections the estimate consists of the corresponding difference, adjusted by the estimated cumulative gain/loss (e.g., referring again to Table 4, the mean differences for 1976 were .520-.421=.099 for the 1975-76 schools, and .496-.463=.033 for the 1976-77 schools; but both of these estimates were adjusted downward by a factor of .016, which represented the cumulative gain from 1975 to 1976 of the early change states on the control states). All of these estimates (one based on 1975, two based on each year from 1976 through 1979, and one based on 1980) were then averaged to provide an estimated "starting point"—i.e., an estimated difference between base-year and control states as of 1975.

Given the three steps described above, it is now a straightforward matter to calculate our "best estimate" of trend lines for law change and control states. Such calculations were carried out for two of the most important measures, annual prevalence and the frequency-of-use index. The calculations are summarized in Table 8, and the trend lines are displayed in Figures 12 and 13. The trend results, of course, are fully consistent with those presented earlier in this chapter, but there is some gain in terms of clarity and simplicity by having the lines continuous between 1975 and 1980. Consistent with our earlier interpretations, they show what appear to be fundamentally parallel lines, with a very modest amount of seemingly random disturbunce.

RESULTS, PART II

An Assessment of Change in Use by Panels of Seniors from the Classes of 1975-1976

In the analyses presented so far, we have been comparing pairs of cross-sectional samples composed of entirely different individuals. A second type of data available for analysis derives from the panels of seniors followed into young adulthood through a series of mailed surveys. The panels have been described earlier, but it may be useful to remind the reader that for the Class of 1975 (as well as for the Class of 1976) there are two non-overlapping panels starting in 1978—one surveyed on even-numbered years and the other on odd-numbered years. Both of these split-half panels overlap in large part, though by no means completely, the considerably larger panel followed through 1976 and 1977.

Our original plan was to follow only the Class of 1975 panel for these analyses—we thus augmented that panel in the early change states for the first few years after high school. However, in the course of conducting analyses, we felt that adding the 1976 panel would help to strengthen the data base from which conclusions could be drawn. While measurement for this panel was not begun until shortly after decriminalization in the early-change states, it is measured prior to the late-change-state decriminalization. Further, because it was initiated just a few months after decriminalization occurred in the early change states, it should capture any longer term, cumulating effects the law change would have on use, even though it would miss the most immediate effect.

One final point by way of introduction. By comparing three subgroups in these analyses defined in the same way as in the above analyses—that is, defined by the state in which they went to high school—we are assuming that individuals remained in the same state and thus were exposed continuously to the same legal environment (that is, to either a criminal or decriminalized status for marijuana possession) over the entire interval covered by the panel. Obviously, this is an oversimplified assumption, since some proportion of young people do leave their home state after high school and some subset of those end up in a state wich has a different type of law. It would be cleaner to eliminate such "changed-condition" cases from each of the three subgroups, but we judged that degree of preciseness not to be worth the considerable effort involved. For the great majority of cases, we think the constant-condition assumption holds. To the extent it does not, any real differences among the three groups will tend to be slightly attenuated.

Procedures

Because of the different panels used, it is necessary to track and compare marijuana use levels separately for each of the different time intervals. In each panel presentation, computations are based on only those individuals who provided data at all points in time plotted (i.e., either two or three time points). Separate

figures are provided in Appendix A for the Class of 1975 using the four following panels: 1975-1976-1977, 1975-1978, 1975-1979, and 1975-1978-1980. (Recall that the second and fourth panels are comprised of the same individuals except for those deleted due to missing data on one or more time points.) For the Class of 1976 four panels with comparable follow-up points are examined: 1976-1977, 1976-1978, 1976-1979, and 1976-1978-1980. (Again, the second and fourth panels are nearly identical.) Trend data have been plotted and examined for these eight panels on each of the three marijuana prevalence measures (lifetime, annual, and monthly) and on the two frequency meaures (daily use in the last month and the overall frequency index). There is thus a total of 40 different plots.

Tables 9 through 13 give the numbers of cases, mean values for each group at the first and last time points only, the change in mean value for each group, the net gain or loss for each experimental state grouping relative to the control states, and the statistical significance of that net gain or loss (based on a t test of differences between mean raw change scores). Particular attention should be paid to the weighted N's in these tables, since after 1977 they are below 110 cases for all experimental groups except one, which means that five or fewer people (and sometimes as few as two) can move a prevalence estimate by 5%. Even some of the earlier panels are of modest size in the experimental states. Therefore, significance testing, which takes into account sample sizes, becomes particularly important in interpreting the believability of the results from most of these panels.*

Our emphasis in this section will be on the examination of the tables which provide a more succinct and qualified summary of the results than do the figures. The 40 figures which graphically present the data contained in these tables may be perused in Appendix A; the above cautions about sample size should be kept firmly in mind.

Post-Decriminalization Effects in the Early-Change States

A brief glance down the column labeled "net gain or loss relative to control states" in Table 9 will yield rather convincing evidence that there is no systematic gain or loss in lifetime prevalence associated with being in an early-change state. On four of the panels there is a net loss and on four a net gain. None of these reach statistical significance and all save one are below 3.0%. The (non-significant) net gain of 9.7% for the 1975-1979 panel stands out as an exception, but since it is based on an experimental panel of only 77 weighted cases and since this increase is not replicated in either the parallel 1976-1979 panel or the adjacent panel from the same cohort (1975-1980) it is hardly very believable.

Turning to the annual prevalence figures from the eight panels in Table 10, we find a very similar picture (as would be expected given the correlation among these usage measures). In the first three panels, where the samples from the early-change

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*The weighted N's, which are lower than the actual N's (due to the oversampled drug-using seniors being weighted down) are probably a reasonable approximation of the effective N's, since modest correction for design effect (which would reduce effective N's) has not been taken into account. On the other hand, we have greater accuracy for the drug using stratum than the weighted N's would imply.

states are of reasonable size, their movement is almost exactly parallel with the control states. Wider fluctuations of both a positive and negative sort occur thereafter, when the samples are very small, but none of these is statistically significant. Again, the largest increase occurs in the 1975-1979 panel; and again, it is not replicated in the parallel 1976-1979 panel.

For monthly prevalence (Table 11), the three initial and largest panels show one net loss of 5.4%, one net gain of 2.8%, and one unchanged. Since none of these is significant, a no-effect conclusion seems warranted. The five longer-term panels show one net loss (of 6.5%); one no-change relative to the controls; and three net gains (of 5.1%, 7.4% and 13.3%), the last of which is statistically significant. But, for each of the three time intervals on which there is an increase in one panel, there is no such increase on the alternate panel ending at the same time point. The largest increase again is observed in the 1975-1979 panel. It is significant at the .05 level despite the small N, but again is not replicated by a similar increase in the parallel 1976-1979 panel or the adjacent panel from the same cohort (1975-1980).

Daily prevalence trends, summarized in Table 12, show the early-change states as decreasing relative to the control states in four of the eight panels, increasing in only one panel, and not changing (i.e., less than 1.0% net change) in three panels. This time, the one significant increase occurs in the 1976-1979 panel, which contains 104 weighted cases, but it is not replicated in the parallel 1975-1979 panel nor in the adjacent panel from the same cohort (1976-1980).

Data on the overall frequency-of-use index are presented in Table 13. As could be expected from the above reuslts, the changes are highly varied across the different panels. There are five net increases on this 2 to 11 scale (.021, .148, .161, .396, and .642) and three net decreases (.055, .116, and .370). These all represent rather small net changes on the absolute scale, as well as on the standardized scale (i.e., stated in standard deviations). The largest change—a net increase of .642 in the 1975-1979 panel—amounts to a net change of less than one-fourth of a standard deviation. It is just significant at the .05 level, but hardly very impressive given an N of 76 in the early-change-state panel. Further, the adjacent panel from the same cohort (1975-1980) shows a net loss of .37.

In sum, the evidence is rather compelling from the lifetime prevalence data that there was no net increase in the proportions of the 1975 or 1976 cohorts of graduating seniors who tried marijuana in the four to five years following decriminalization. The evidence is very similar on annual, monthly, and daily use for the first two to three years following decriminalization. Moving to the smaller panels we have available on the longer time intervals, we found a more "noisy" picture, but one which on balance suggested very little or no systematic change on these measures.

The frequency of use index did show one early panel interval (1976-1977) as containing a statistically significant, but very small net increase (of .06 standard deviations). This could be real, since it is closely paralleled by a nearly comparable increase in the parallel 1975-1977 panel, but it is hardly of substantive importance. The larger net increase in frequency of use, of slightly under a quarter of a standard deviation, occurred in a longer-term panel (1975-1979). It was not replicated in the even longer-term panel from the same cohort (1975-1980), however.

Anticipatory Effects in the Late-Change States

There are only two panels covering the pre-decriminalization period for the late-change states (1975-1977 and 1976-1977), the former of which contains only about 130 weighted cases while the latter contains 330. The larger and therefore more reliable 1976-1977 panel shows no anticipatory net change in lifetime prevalence (0.0%), a negligible increase in annual prevalence (1.0%), a small net increase in monthly prevalence (2.5%), a negligible net loss in daily prevalence (0.6%), and a negligible increase on the frequency-of-use index (.064 on the 2 to 11 scale). Overall, these data give a picture of no anticipatory effect, consistent with the earlier findings based on senior class comparisons.

The less reliable 1975-1977 panel tells exactly the same story for the same one-year interval preceding decriminalization, i.e., from 1976 to 1977 (see the relevant figures in Appendix A). However, due to changes in the year prior to that (i.e., 1975 to 1976) there is an overall net gain observed across the two-year period in lifetime prevalence (5.7%), annual prevalence (4.9%), and daily use in the prior 30 days (1.7%); but monthly prevalence shows a slight net loss (0.9%). None of these changes is statistically significant, though the modest net increase in the frequency of use index (.185, or .07 standard deviations) did reach significance at the .05 level. However, whether these relative changes are to be believed in light of the very small N's, the mixed results for different measures, and the inconsistency with senior year results reported earlier, is open to considerable question. Overall, we feel that the evidence is strong that there is no anticipatory effect in the year immediately prior to the decriminalization and at best questionable in the year prior to that.

Post-Decriminalization Effects in the Late-Change States

Once again, the panels which span the period 1977 to 1979 for the late-change states are very small, in this case ranging only from 32 to 81 weighted cases. The results, therefore, can be anticipated to be erratic and, at best, can only be treated as suggestive. What they show, based on the six panels which encompass one or more of the post-change years (always in addition to one or two of the pre-change years) is a pattern which is predominantly movement parallel to the control states or perhaps even one of a decrease in use relative to them.

On lifetime prevalence, three panels show a net loss, two a net icrease, and one no change (i.e., less than 1% change relative to the controls). For annual prevalence there are two net losses, three net gains, and one with no relative change.

On monthly prevalence there are three net losses, no net gains, and three no changes; and for daily use there are four net losses and only two net gains. All in all, net losses seem to predominate, though again the data can only be taken as suggestive. Certainly the pattern of evidence does not give support to the hypothesis that there is a post-decriminalization effect.

Summary Statistics

Before closing this section, it is useful to consider a column in each of the panel analysis tables which has not been discussed so far—the one labeled "eta (adjusted) on change for three groups." Eta-squared is a measure of the proportion of the total change occurring across the panel interval which lies among the three comparison groups, as opposed to within them. It therefore reflects differential change. Eta, of course, is the square root of that quantity; it can be thought of an analogous to the product-moment correlation (r), except that eta is not limited to linear relationships. Eta-adjusted is an estimate of the eta value after correcting for the amount of variability between groups which would be expected, given their sample sizes, on the basis of chance alone (i.e., even if they all came from the same distribution). It is instructive to note in Tables 9 through 13 that the great majority of etas adjust to zero, which means that for the most part, the differential change observed among the three groups is readily attributable to chance, given the group sizes. The exceptions tend to be very small, with adjusted etas less than .10 in all cases, and many of these are due to net losses by one or both experimental groups relative to the controls, as well as to net gains. The overall impression one gets from these summary statistics is one of random variation in the group change scores. The evidence for any positive or negative impact of decriminalization on these panels is very thin and certainly not consistent across panels. The largest of the adjusted etas, when squared, suggest that even if there were an effect, it would probably account for less than one percent of the true variation in change scores across the three groups combined.

RESULTS, PART III

Assessing the Impact of Decriminalization on Possible Intervening Variables

While marijuana decriminalization may show little observable evidence of affecting use of the drug—which certainly seems to be what we have found—we and others have argued (Johnston, 1983; National Governors' Conference, Vol. I, 1977) that it could affect attitudes and beliefs about the drug, social norms, availability, or other intervening variables. These changes, in turn, might only gradually translate into changed behavior longer-term. The fact is that in the present study we already have looked at a fairly long post-decriminalization period, so one would have to hypothesize a very long lag-time for the process not yet to have eventuated in changed behaviors. Nevertheless, it seems reasonable to look at those intervening variables available for examination, which is what we do in this section. We will look for a potential impact from decriminalization on the perceived availability of marijuana and, more importantly, on individuals' attitudes and beliefs about the drug. Taken in the aggregate, those attitudes and beliefs are likely to translate fairly directly into peer norms.

Impact on Perceived Availability of Marijuana

Figure 14 displays shifts in the mean value derived from an annually administered question in which respondents are asked how hard it would be for them to get marijuana if they wanted some.* The answer scale runs from one, "probably impossible," to five, "very easy." As the concentration of mean values near the top of the scale demonstrates, ever since the study began in 1975 nearly all seniors said marijuana was "fairly easy" (category four) or "very easy" (category five) for them to get. Furthermore, this fact has changed little over the intervening five years.

An examination of Figure 14 leads us to conclude that decriminalization has had no discernible impact on this measure of availability. In older age groups, for whom availability is presumably less universal, the outcome could conceivably be different.

Impact on Attitudes and Beliefs About Marijuana

Several lines of analysis in our earlier work (Johnston, et al. 1980, and Johnston, 1981) have suggested that perceptions about the harmfulness of marijuana are important determinants of its use or non-use. One questionnaire form in our

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*Since this question is contained in only one of the five questionnaire forms, the N's are approximately one-fifth the number of students given in Table 3 for each group at each time point. The same is true for the remainder of the dependent variables with which this section deals.

standard annual survey contains a set of questions about the risk of harm involved in using certain drugs at varying levels of frequency. On a 4-point Likert scale, running from "no risk" (coded 1) to "great risk" (coded 4), respondents are asked to answer the following question: "How much do you think people risk harming themselves (physically or in other ways), if they..." This question is answered in relation to three marijuana-specific behaviors: "try marijuana once or twice," "smoke marijuana occasionally," and "smoke marijuana regularly." As would be expected, the risk judged to be associated with regular use is substantially higher than for occasionally use, which in turn is higher than for experimental use (Johnston, et al. 1980).

An index score was calculated for each individual based on a simple mean of the answers to these three questions (with no missing data allowed). The trends across senior classes for this index of perceived risk are presented in Figure 15. One might have hypothesized that decriminalization by a state legislature might inadvertently communicate to young people the message that marijuana use is safe. Under such a hypothesis, one would expect the risk associated with use to drop relative to the control states either before or after decriminalization. As Figure 15 shows, however, there is virtually no evidence to support such a contention. There was a curvilinear movement over this historical period in the beliefs young people held about the harmfulness of marijuana use, with a drop occurring between 1975 and 1977 and then a rise occurring between 1978 and 1980. There is no sign, though, that either of the experimental state groups dropped faster than the controls in the early period nor that they rose more slowly in the later period. In fact, there is only one case of a net loss in perceived risk by an experiemental group relative to the control states, but several cases of a net gain. (In this case, a net gain means they tend to see more risk.) Clearly, the hypothesis that decriminalization will lead young people to think marijuana use is more safe is refuted in the present data. And it should be mentioned in passing that the use of the index of perceived harmfulness did not mask any important differences among the risk assessments for the three separate levels of use. The story remains highly consistent across all three levels taken individually.

Another very important set of determinants of drug use certainly are the norms held by peers (Kandel, 1973). Also, each individual's general sentiment (in terms of approval or disapproval) is certainly likely to be a key factor in determining his or her own use. Using a single set of measures we can in a sense address both of these factors, since individual disapproval in the aggregate comprises the sentiment of peers. Aggregate disapproval is not quite the same thing as peer norms, since that disapproval may or may not be communicated to peers. However, we think it amounts to a reasonable indicator of peer norms, partly because we know from aggregate level analyses that it moves in parallel across time with expected peer disapproval for marijuana use (see Johnston, et al. 1980, p. 94).*

The measure of disapproval of marijuana use reported here is based on a general question which reads, "Do you disapprove of people (who are 18 or over)

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*Trends in perceived peer norms are not presented here because they were not measured in 1976 and 1978. For the present type of one-year-interval analyses, therefore, there are insufficient data to track changes in four of the five one-year intervals.

doing each of the following?" Respondents then answer separately for trying marijuana once or twice, smoking marijuana occasionally, and smoking marijuana regularly, indicating whether they (1) "Don't disapprove," (2) "Disapprove," or (3) "Strongly disapprove." Disapproval, like perceived harmfulness, turns out to be highest for regular use and lowest for experimental use; and this variable also has had a curvilinear trend across the five-year time span, with an overall drop in disapproval from 1975 to 1977 and an overall rise in disapproval from 1978 to 1980 (Johnston, et al. 1980).

Figure 16 shows how the late-change and early-change states compare with the control states in their trends over five years. Once again, the hypothesis offered for consideration is that by decriminalizing marijuana possession, legislators are removing some of the social stigma or social sanction associated with marijuana use, which will in turn change how young people feel about it. The results in Figure 16, however, do not support this hypothesis. In six of the ten pairwise comparisons between the slopes of each of the experimental-state lines and the corresponding control-state line, the experimental states gained on the control states in their levels of disapproval, in two there was virtually no gain or loss, and in only two was there any loss (for the late-change states in 1977-1978 and for the early-change states in 1979-1980). Summing across the five one-year changes for each group yields a drop of .20 points on the disapproval index for the control states, a very comparable drop of .22 points for the early change states, and actually a cumulative increase in disapproval of .20 points in the late-change states (standard deviation = .75).

Thus individual levels of disapproval, which might have influenced future use, have not been reduced as a result of decriminalization; and in the aggregate, one would not expect any impact on peer norms, since individual attitudes have been unaffected. A further examination of the individual trend figures for each of the three levels of marijuana use rated separately (figures not presented) reveals that nothing is lost in working with a single index score. Each individual component behaves very similarly to the index.

In sum, none of the three intervening variables which we thought might have been affected by decriminalization, and which therefore might have led to a rather long-term impact, has proven to be so affected. The findings are relatively unambiguous for our measures of marijuana availability, beliefs about the potential harmfulness of marijuana, and personal disapproval of marijuana use (which in the aggregate should largely determine peer norms). None of these factors appears to have been influenced by decriminalization over the five-year period examined.

RESULTS, PART IV

Trends in Knowledge of the Prevailing Law

Given that we have found no convincing evidence of any impact from decriminalization on either marijuana-using behaviors or related attitudes, a relevant question is whether young people were even aware of these laws or of any changes in them. After all, one can only expect an impact if the objective reality of the law change is translated into a subjective reality for the population under study. With this issue in mind, we added an item to one of the five questionnaire forms, beginning in 1976; the question asked seniors what they thought the prevailing law was in their state pertaining to the "possession in private of an ounce or less of marijuana by an adult." Table 14 gives the full question wording and the answer alternatives, as well as the response distributions, for 1976 through 1980 from seniors in the early-change, late-change, and control state samples of matched sets of schools.

Figure 17 graphs the trends in the proportion saying that such possession is "a criminal offense carrying a possible jail sentence," and it contains several facts of obvious relevance to the present discussion. First, by 1976 very few (only about 10-15%) of the respondents in the early-change sample erroneously believed a possible jail sentence pertained in their states. Second, while nearly 60% of the late-change-state respondents accurately perceived that a jail penalty pertained in 1976, that proportion dropped dramatically in both the year preceding decriminalization and the year that decriminalization actually occurred. There was, in essence, an anticipatory effect, probably as a result of extensive public and legislative debate, and also perhaps because of some confusion about when the newly enacted law actually took effect. In any case, it appears that 40-50% fewer of the late-change-state respondents in 1979 felt there was a penalty than in 1976. The third line in Figure 17 indicates that only around 30-35% of the respondents in the control states seemed to know that possession of marijuana was a criminal offense in their states carrying a possible jail sentence. (Roughly another 20% thought it was a criminal offense, but without option of a jail sentence.) A substantial fraction in all types of states—between 20-35%—rather consistently indicated not knowing what the law was.

In sum, we can say from the data just reviewed that there were substantial shifts in the perceptions of prevailing laws, but also that there were sizeable segments of the population in all three types of states who either did not know what the law was, or who very likely had an incorrect perception of what it was. In the decriminalized states roughly 10-20% of the respondents still believed that the penalty could include a jail sentence, while in non-decriminalized states roughly 30-40% incorrectly believed that a jail sentence was not an option. Some of the ignorance of the law, and misinformation about it, is undoubtedly attributable to the segment of the population who just were not personally concerned with the issue of whether to use or not. In the case of the non-decriminalized states, some may also have come from non-utilization by the courts of the option to jail first offenders. Despite the large segments of all three popualtions who apparently were ill-informed

about the laws concerning marijuana possession, however, it is the case that substantial portions were aware of the change. Thus the lack of impact of the law change or usage rates and relevant attitudes certainly cannot all be attributed to the message not having reached the relevant population.

Before leaving Table 14, we should mention one other fact of relevance to the debate over marijuana decriminalization. It should be apparent from the extremely small proportions who chose answer category (4)—"Not a legal offense at all"—that practically none of these young people mistook decriminalization for legalization. The fractions generally run from 1-6% in the experimental states and are not much different from the 1-4% observed in the control states.

SUMMARY AND CONCLUSIONS

In ten of the fifty states marijuana possession currently is decriminalized. Seven of those states decriminalized during the five-year historical period covered by the present study (1975-1980) and provided cases which were used in our analyses; four of them decriminalized between late 1975 and early 1976, and three decriminalized in mid-1977. Using most of the remaining states in the country as a contrast or "control" group with which to estimate the changes which probably would have taken place in the "experimental" states had there been no decriminalization, we have attempted to assess the impact of the law change at the state level on marijuana use by American young people. We have also examined the impact on their attitudes, beliefs, and peer norms relating to its use. Having the comparison data proved to be very important, since marijuana use (as well as related attitudes and beliefs) changed considerably during this period, even in the absence of decriminalization, and in ways which might very likely have been mistaken for an effect of decriminalization.

Two quite different sources of data have been used here: repeated cross sections from successive classes of graduating high school seniors (by far the larger and therefore more reliable data base) and longitudinal data on several panels of individuals drawn from the graduating classes of 1975 and 1976. (These panels tended to be very small after 1978.)

A long enough time span was encompassed to permit us to assess: (a) any "anticipatory" effects within two years immediately prior to the law going into effect; (b) any short-term effects post-decriminalization; and (c) any longer-term effects, ranging up to four years after decriminalization.

Overall, the preponderance of the evidence which we have gathered and examined points to the conclusion that decriminalization has had virtually no effect either on the marijuana use or on related attitudes and beliefs about marijuana use among American young people in this age group.

The repeated cross-sectional data show no evidence of any anticipatory effect in the late-change states (the only ones for which we have longer-term "before" data) and absolutely no evidence in either the early-change or late-change states of any increase, relative to the control states, in the proportion of the age group who ever tried marijuana. In fact, both groups of experimental states showed a small, cumulative net decline in lifetime prevalence as well as in annual and monthly prevalence after decriminalization (see Table 15). Nor is there any evidence over the full post-decriminalization interval of an increase in the frequency of use in the marijuana-using segment of the population judging by the overall frequency-of-use index. Looking specifically at daily use in Table 15, we see that the early-change states showed no sign of a net increase in daily use relative to the control states over the full post-decriminalization interval, but that the smaller samples from late-change states did show a cumulative increase of 4.4%. However, we are strongly inclined to discount most or all of that apparent net gain in daily use as due to error,

since (a) 2.4%, or more than half of it, was due almost totally to a change in one school in the last year, when only four schools comprised the late-change panel, (b) the finding is not replicated in the other measures (in particular, the frequency measure) from the late-change states, and (c) it is not replicated in larger and more reliable early-change-state samples.

If one were trying to make the case for an effect having occurred, probably the most convincing evidence comes from the data in the late-change states in the year of decriminalization (1977-1978). There is a modest, temporary net increase in their current usage measures that year, but one which is quickly offset by net decreases in the two following years. Given that no such increase was observed in the larger sample of early-change states, we are inclined to view this shift as a random fluctuation. Even if real, the "impact" is certainly very limited in scale and short-lived in duration. Thus, the great majority of the evidence from our most sizeable and reliable data sets—the repeated cross sections of seniors—supports the no-effect hypothesis. Figures 12 and 13, presented earlier in this report, provide our best estimate of what actually occurred across this interval based on the available data, though they still contain fluctuations due to error.

In addition to the above procedures, which were intended to determine whether there were statistically significant differences associated with decriminalization, we used a different analytic procedure (weighted least squares regression) to obtain the best statistical estimates of the effects of decriminalization. The details are presented in Appendix B, but the results are consistent with the analyses above, and can be summarized succintly: the pattern of findings is best explained as reflecting no law-change effects.

The more tenuous evidence gathered from the several panels of individuals sampled from the graduating classes of 1975 and 1976, which were followed for varying intervals of time, adds further support for this conclusion. We say the evidence is more tenuous because most of the panel samples in the experimental states were small, and in several cases extremely small. The largest and by far most reliable panels span the time interval 1975 to 1977; these, like the repeated cross-section analyses, showed for the early-change states virtually no net increase after decriminalization on any of the prevalence measures (including daily use), and only a tiny increase on the frequency-of-use index.

Regarding possible anticipatory effects for the late-change states across the same interval, the larger of the two available panels (1976-1977) showed no such effect. The smaller 1975-1977 panel (N=130) showed no anticipatory effect in the year immediately preceding decriminalization, but the possibility of some modest net gain on the year prior to that on some measures; however, given the very small N, the inconsistency with all other results on anticipatory effects (based on much larger samples), and the inconsistency among different measures on this same panel, we still judge the evidence as pointing strongly to the conclusion that there is no anticipatory effect on this age group.*

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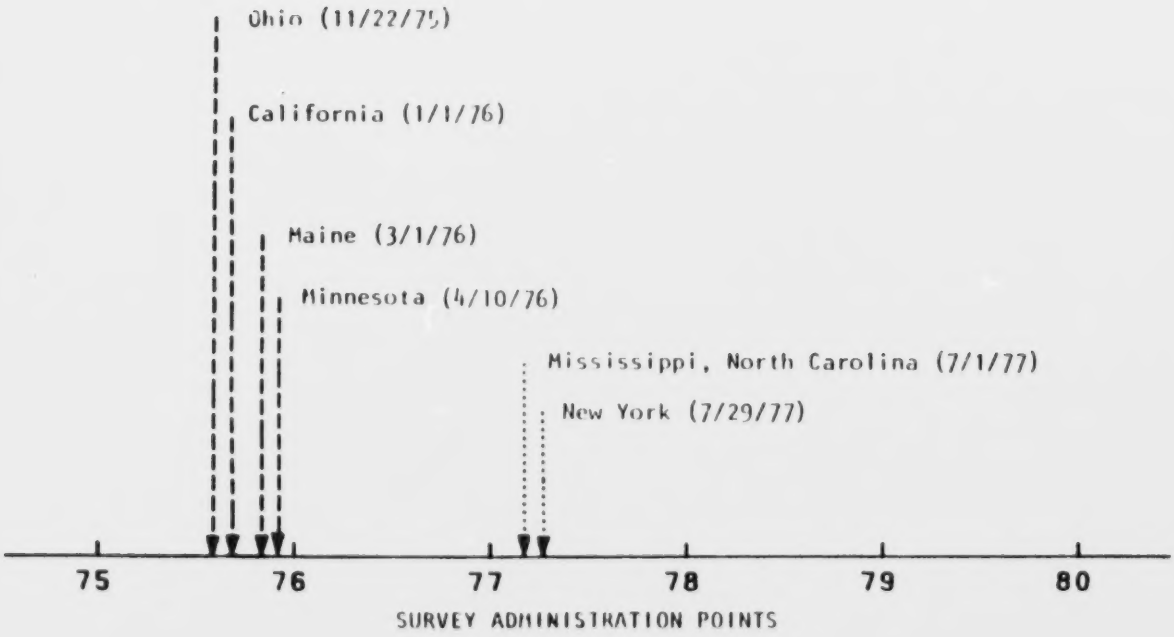
*Otherwise one would need to hypothesize that 18-year-olds (seniors) do not suffer such an effect but that 19-year-olds do, which would require some fairly intricate logic to rationalize.

The longer-term panel data are even more "noisy," as we have said, due to their very small sample sizes. Despite that fact, their results proved, for the most part not to be at variance with those from the larger samples. While there were wider fluctuations both in the direction of net losses as well as net gains relative to the control states, they failed to show any kind of systematic pattern and appear to be due to chance fluctuations. Generally, when there was evidence of a net change, it was not replicable across other panels which covered approximately the same time span. In sum, the general pattern of evidence from the panel analyses tends to support the conclusion reached earlier for the repeated cross-section analyses—that the prevalence and frequency of marijuana use are not affected by decriminalization.

Also found to be unaffected by the law change were the degree of disapproval young people hold for marijuana use, the extent to which they believe such use is harmful, and the degree to which they perceive the drug to be available to them. Since any very long-term impact on use would most likely act through changes in these intervening variables, we take this complete absence of change in them as predictive of there being no longer-term change in use as a result of decriminalization. While these results may or may not be generalizable to older age groups, for whom criminal sanctions could be more important, we believe these findings answer a key question in the marijuana-decriminalization debate concerning the impact of decriminalization on the age group historically most "at risk" for illicit drug use—those in their late teens and early twenties. Undoubtedly, there will remain strong disagreements about other factual and philosophical issues relevant to marijuana decriminalization, but we hope this study has succeeded in bringing balanced scientific answers to at least some of the questions in the ongoing debate.

FIGURE 1

EFFECTIVE DATES OF STATE DECRIMINALIZATION STATUTES



Note: The point demarcated '75 in this, and all figures to follow, corresponds to the interval of data collection in the spring of that year. The same is true for 1976 and each additional year.

FIGURE 2

LIFETIME MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

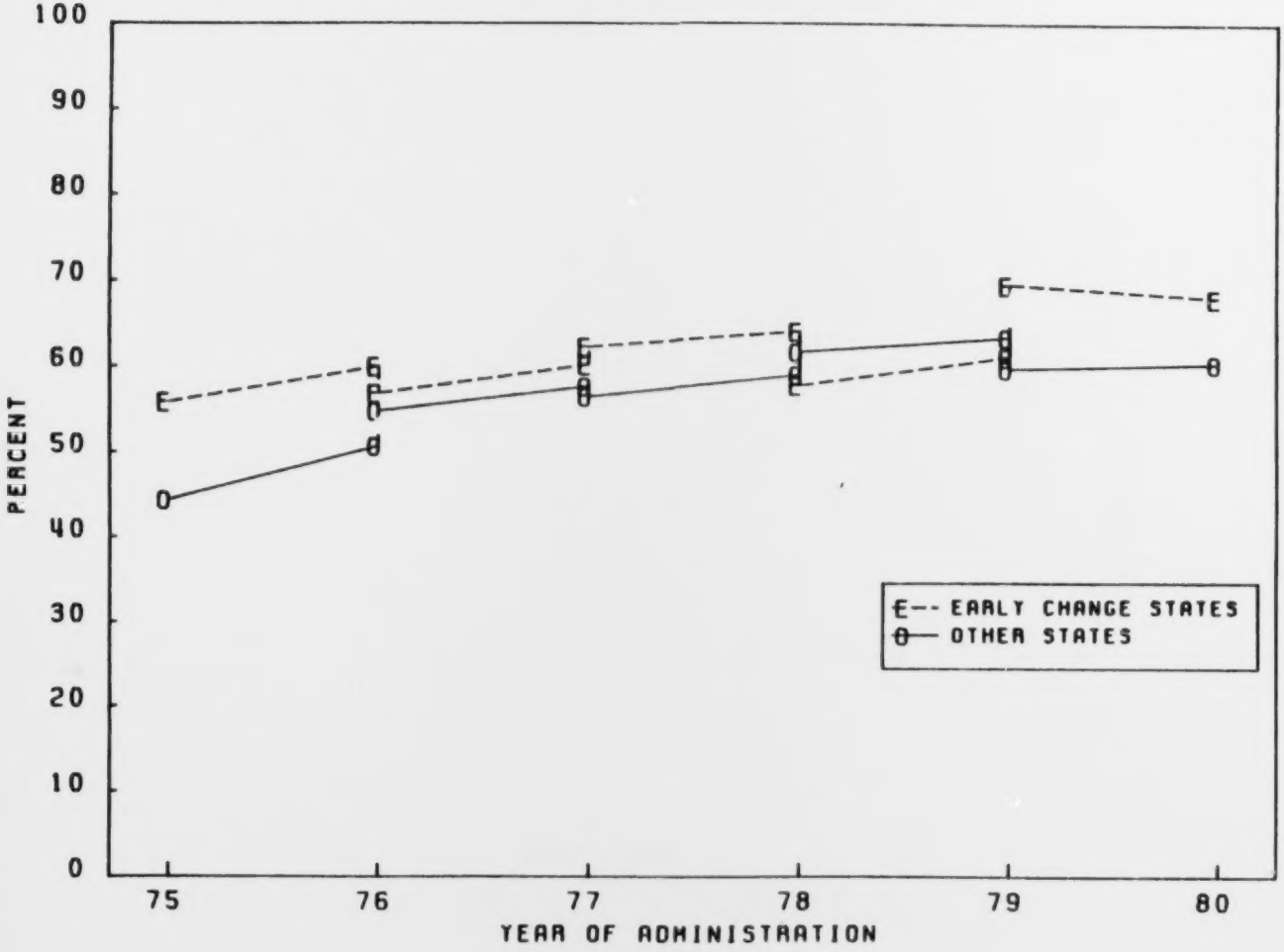


FIGURE 3

ANNUAL MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

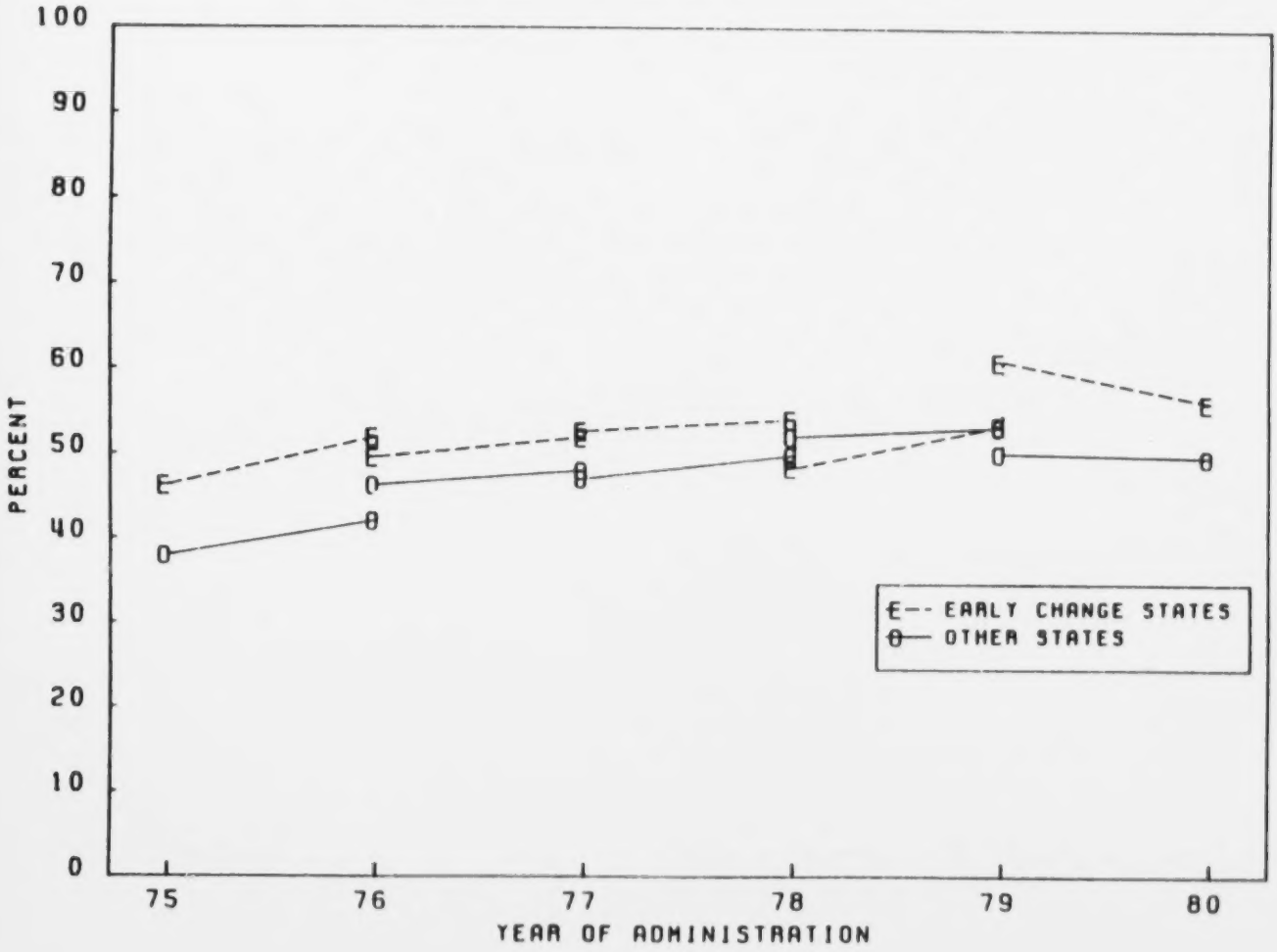


FIGURE 4

MONTHLY MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

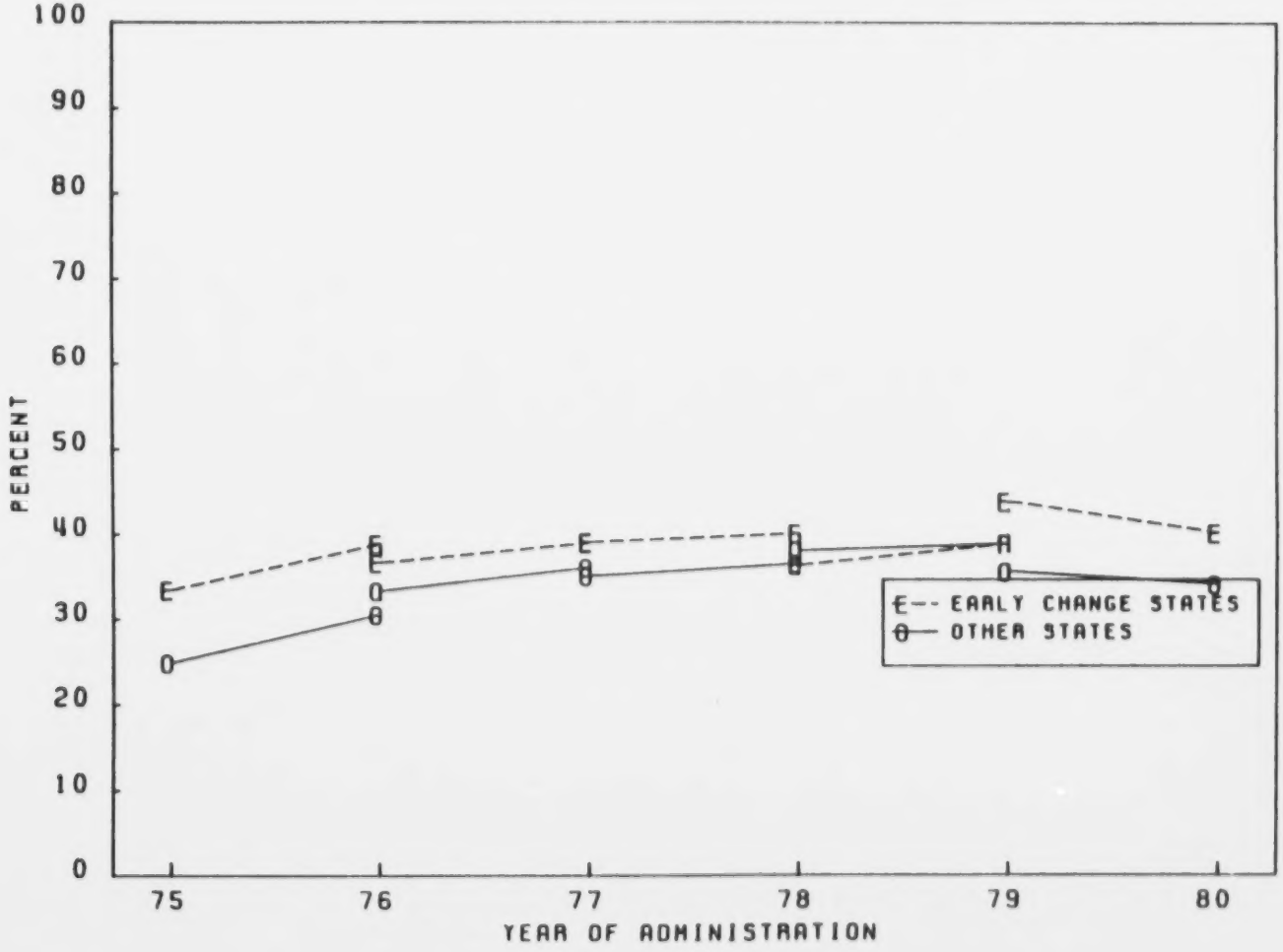


FIGURE 5

DAILY MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

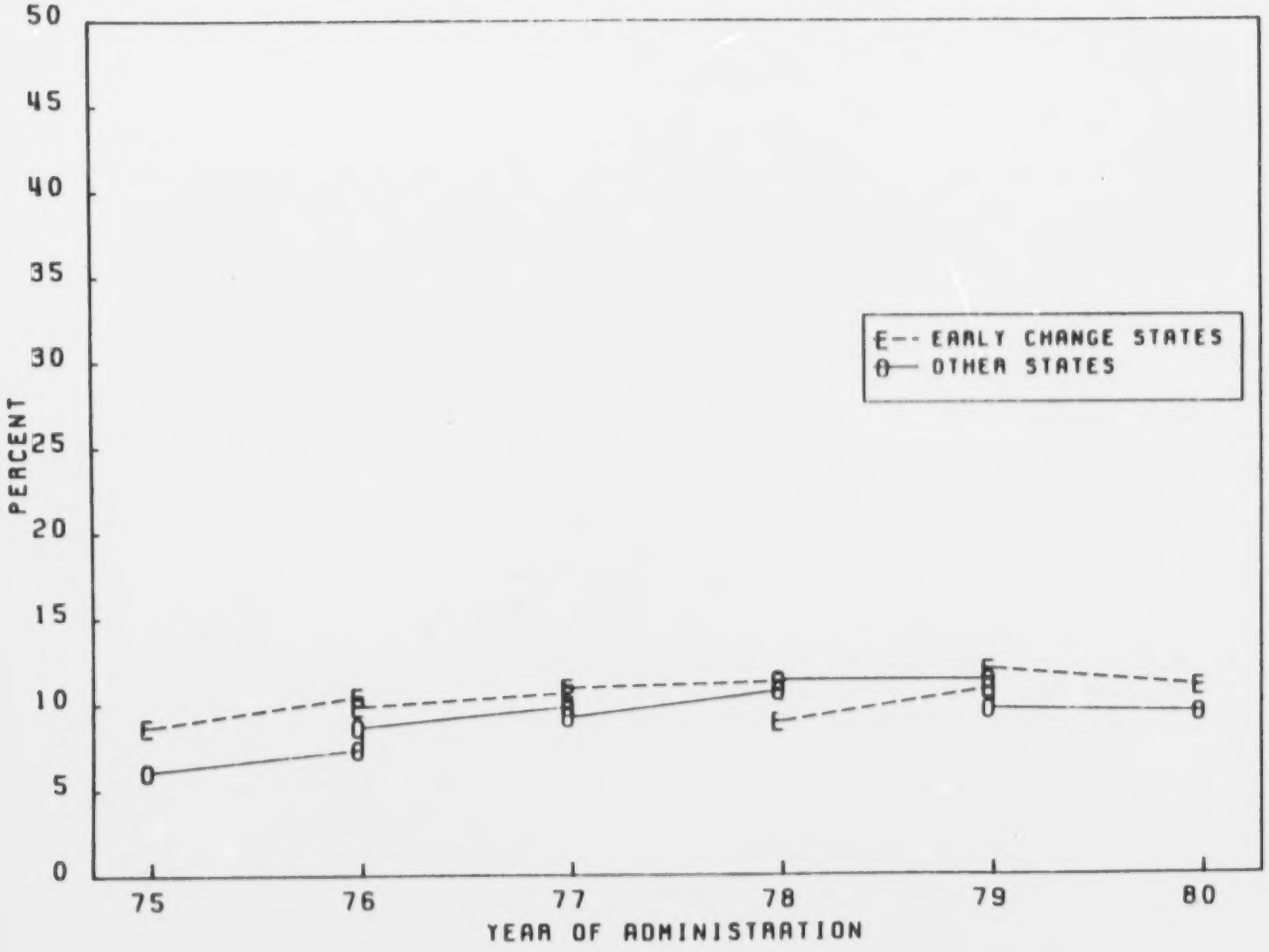


FIGURE 6

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
COMPARISONS ACROSS SENIOR CLASSES

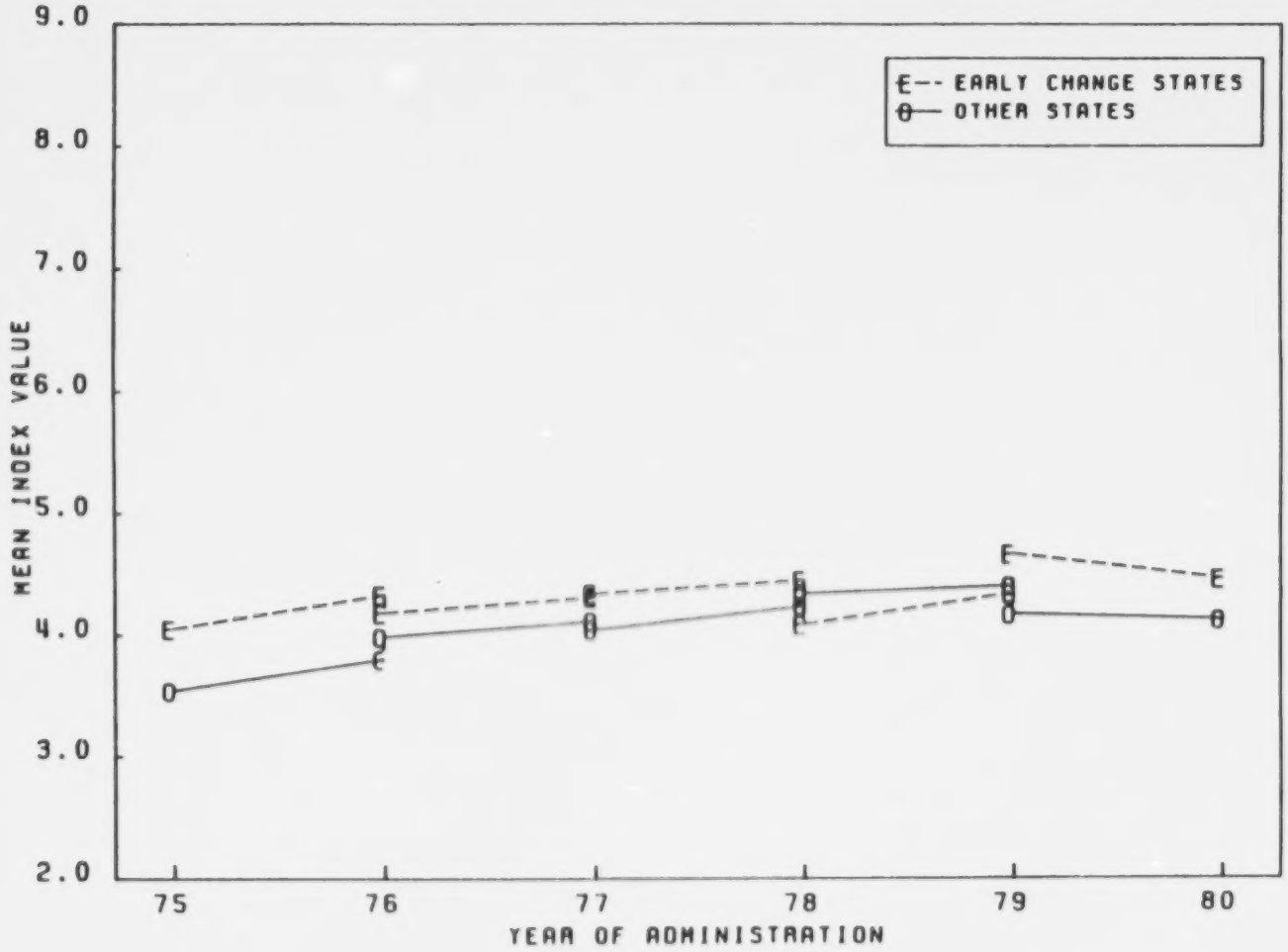


FIGURE 7

LIFETIME MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

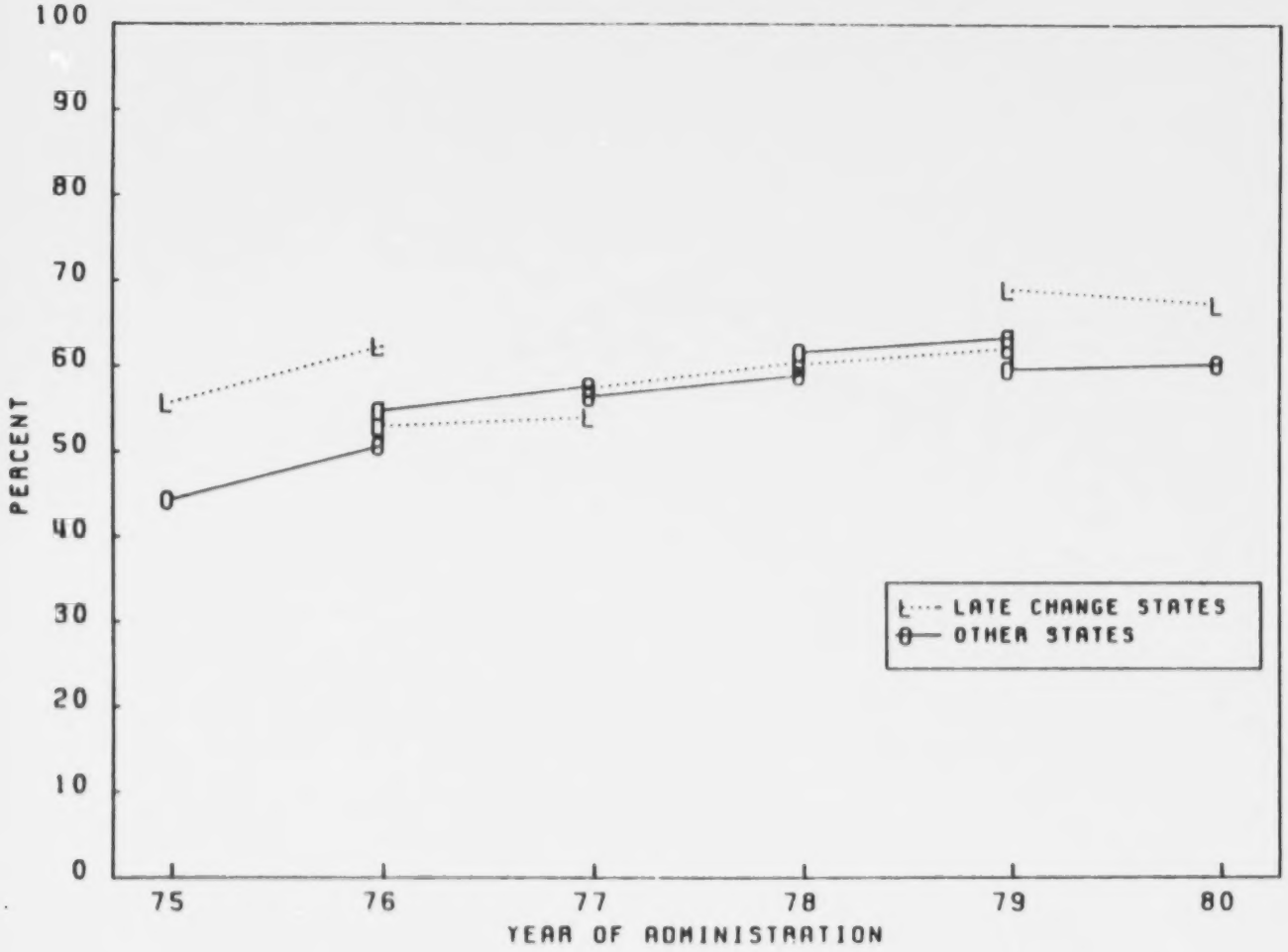


FIGURE 8

ANNUAL MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

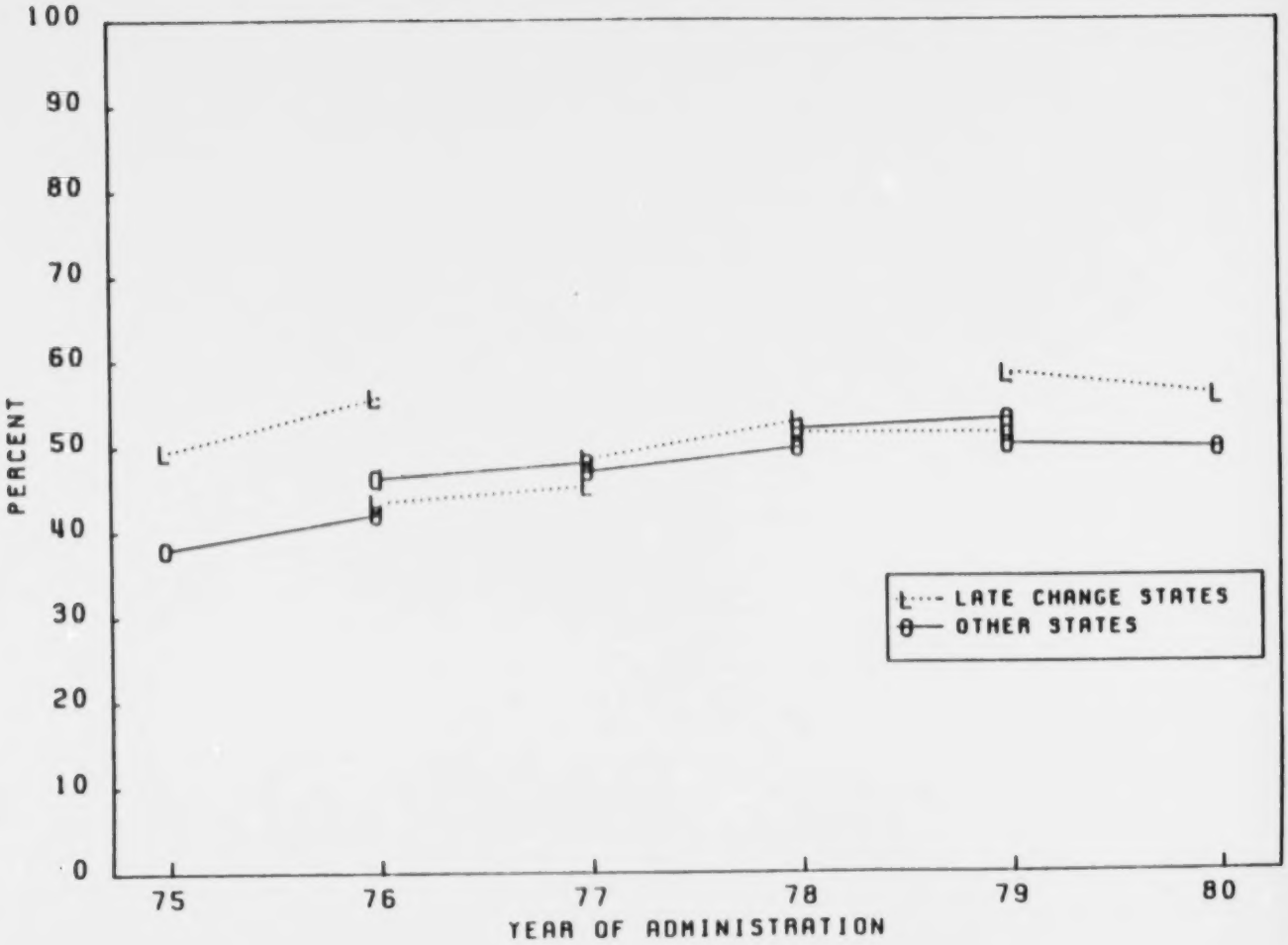


FIGURE 9

MONTHLY MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

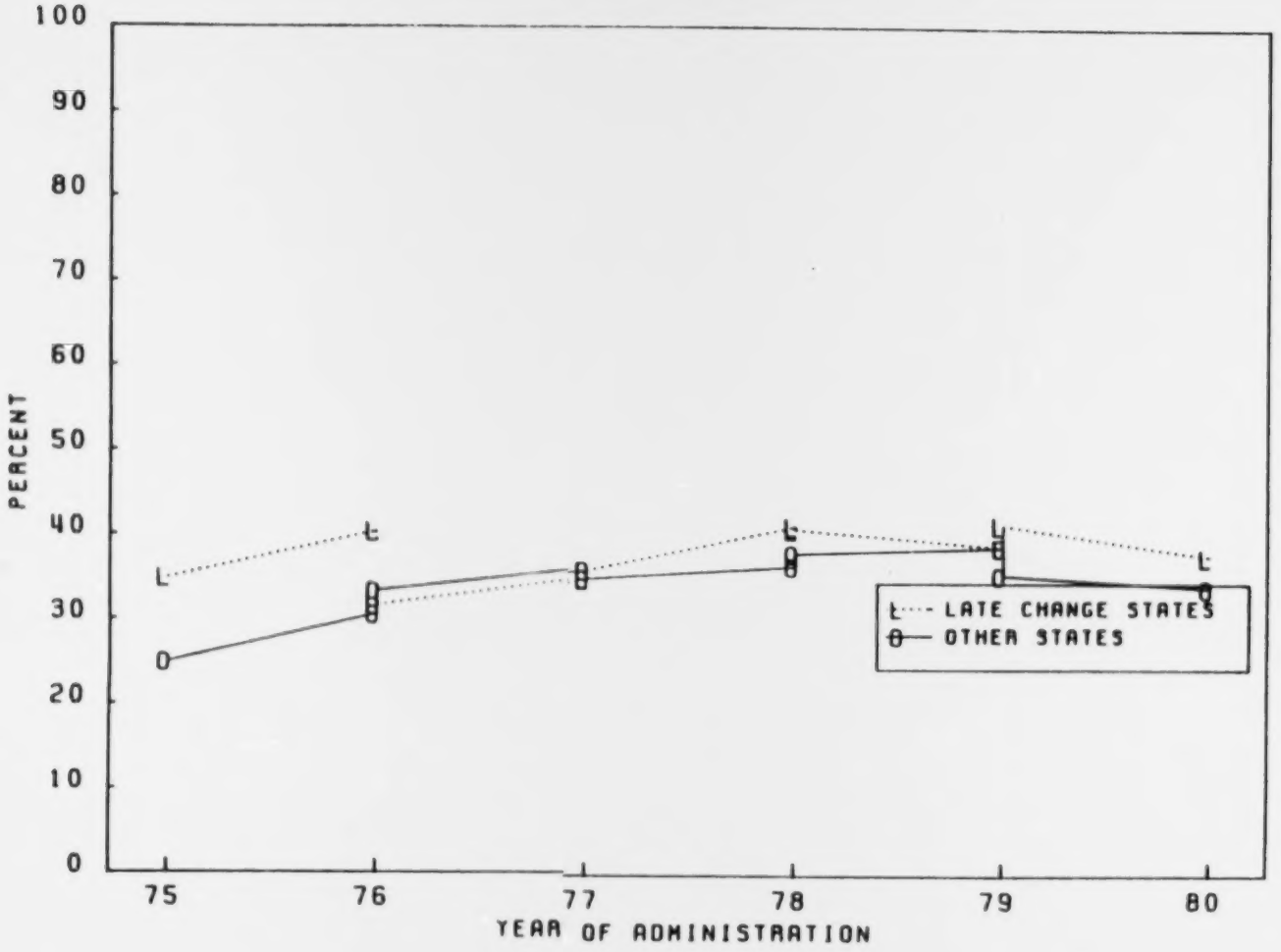


FIGURE 10

DAILY MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES

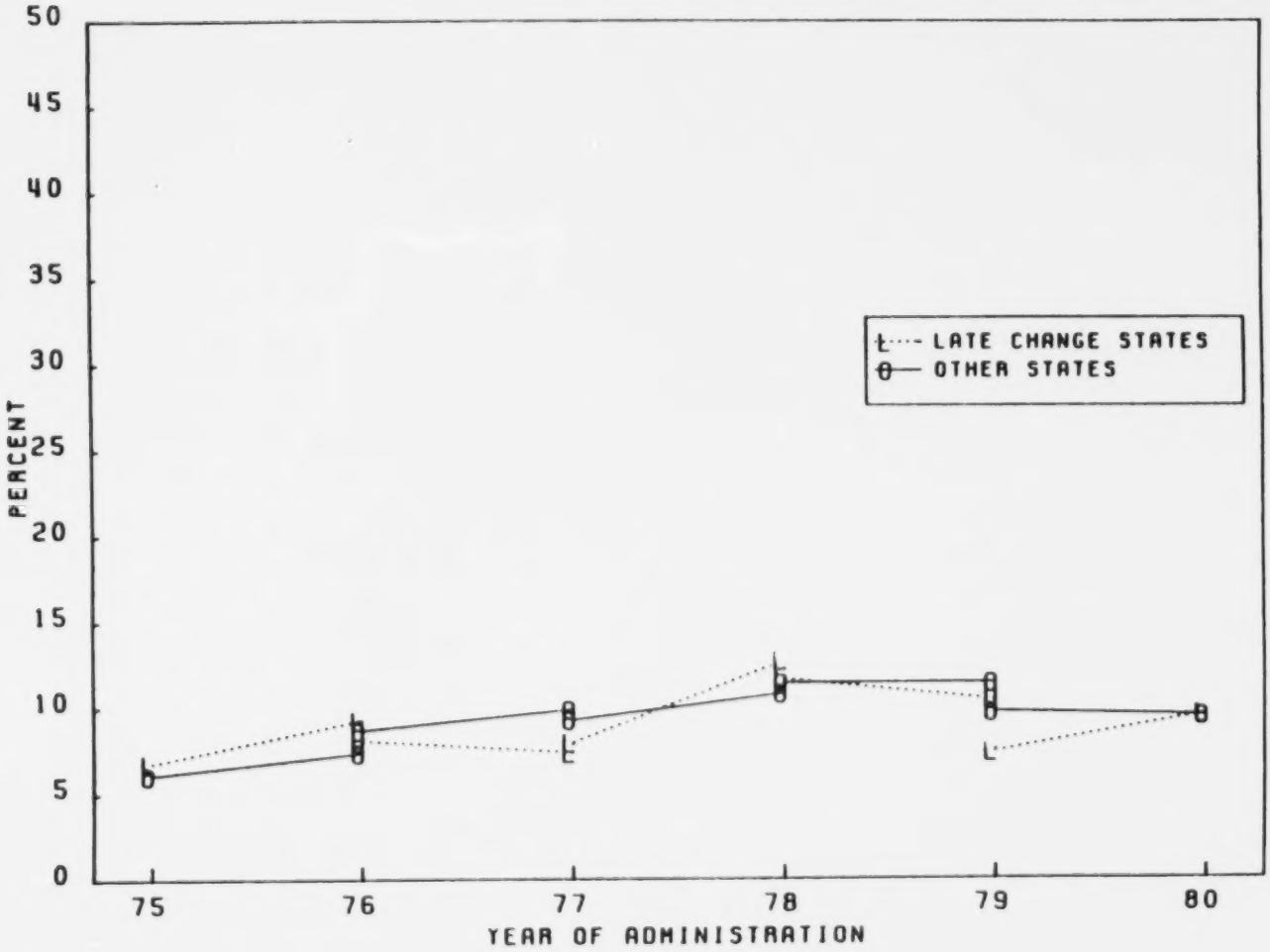


FIGURE 11

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
COMPARISONS ACROSS SENIOR CLASSES

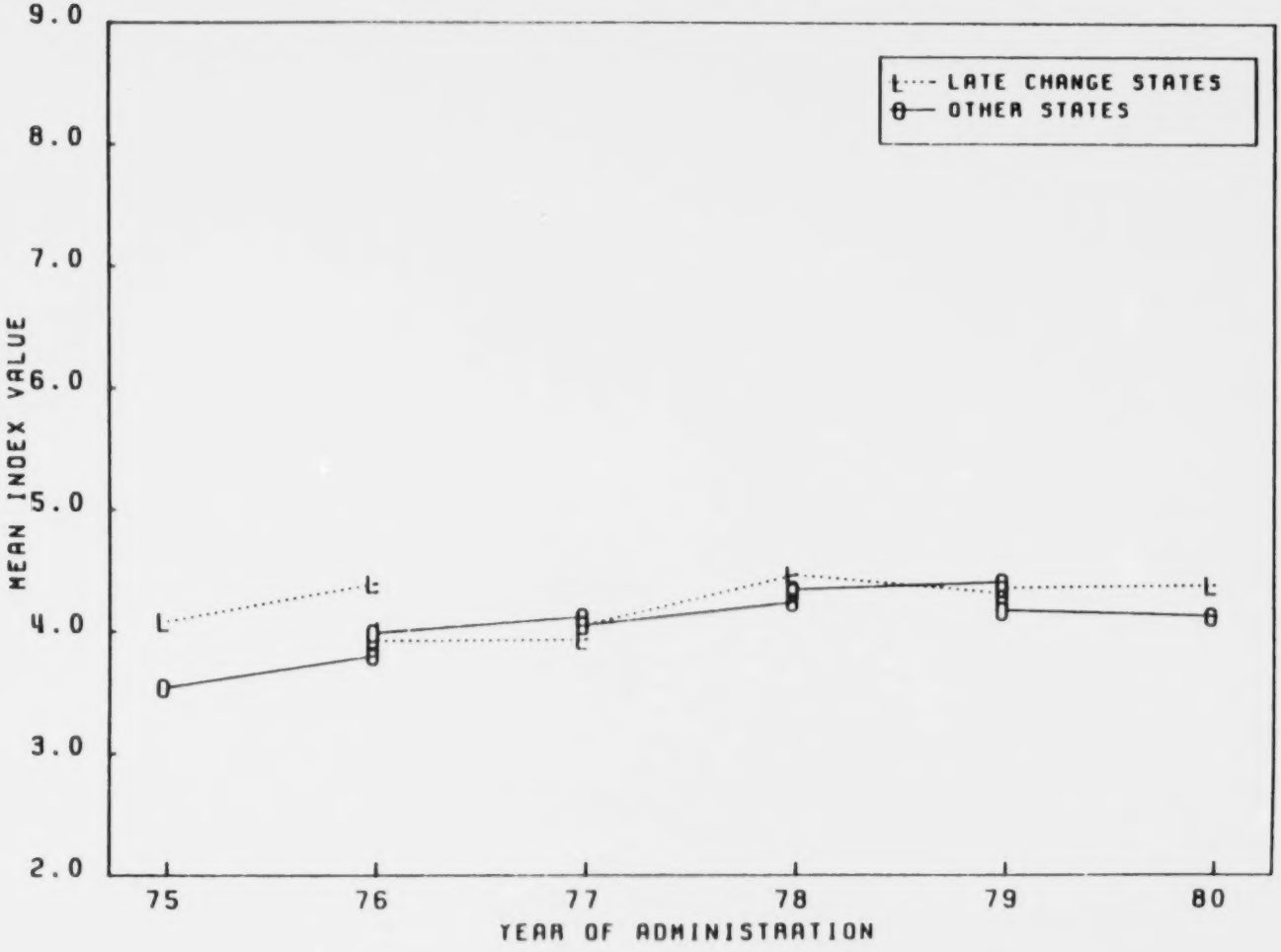


FIGURE 12

ANNUAL MARIJUANA PREVALENCE
COMPARISONS ACROSS SENIOR CLASSES (ADJUSTED ESTIMATES)

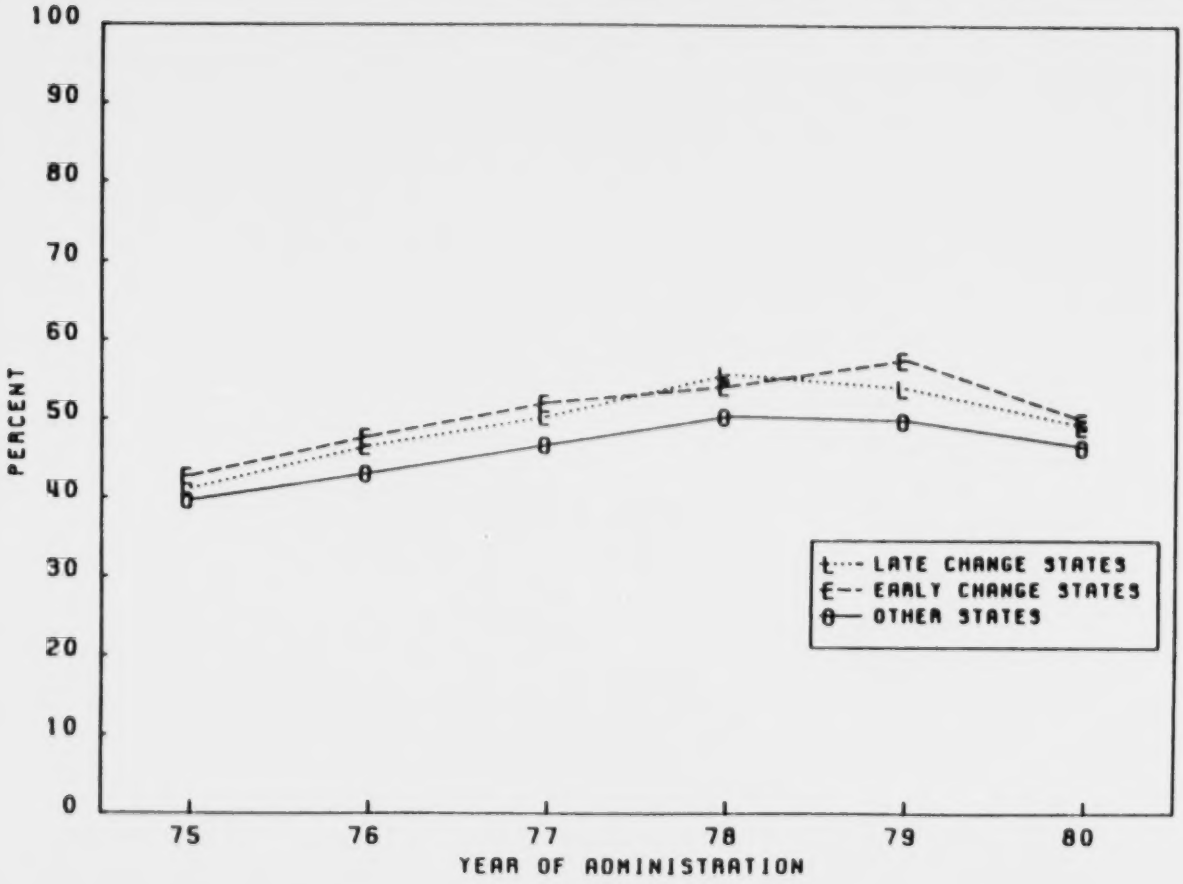


FIGURE 13

MARIJUANA FREQUENCY INDEX(2 TO 11 SCALE)
COMPARISONS ACROSS SENIOR CLASSES(ADJUSTED ESTIMATES)

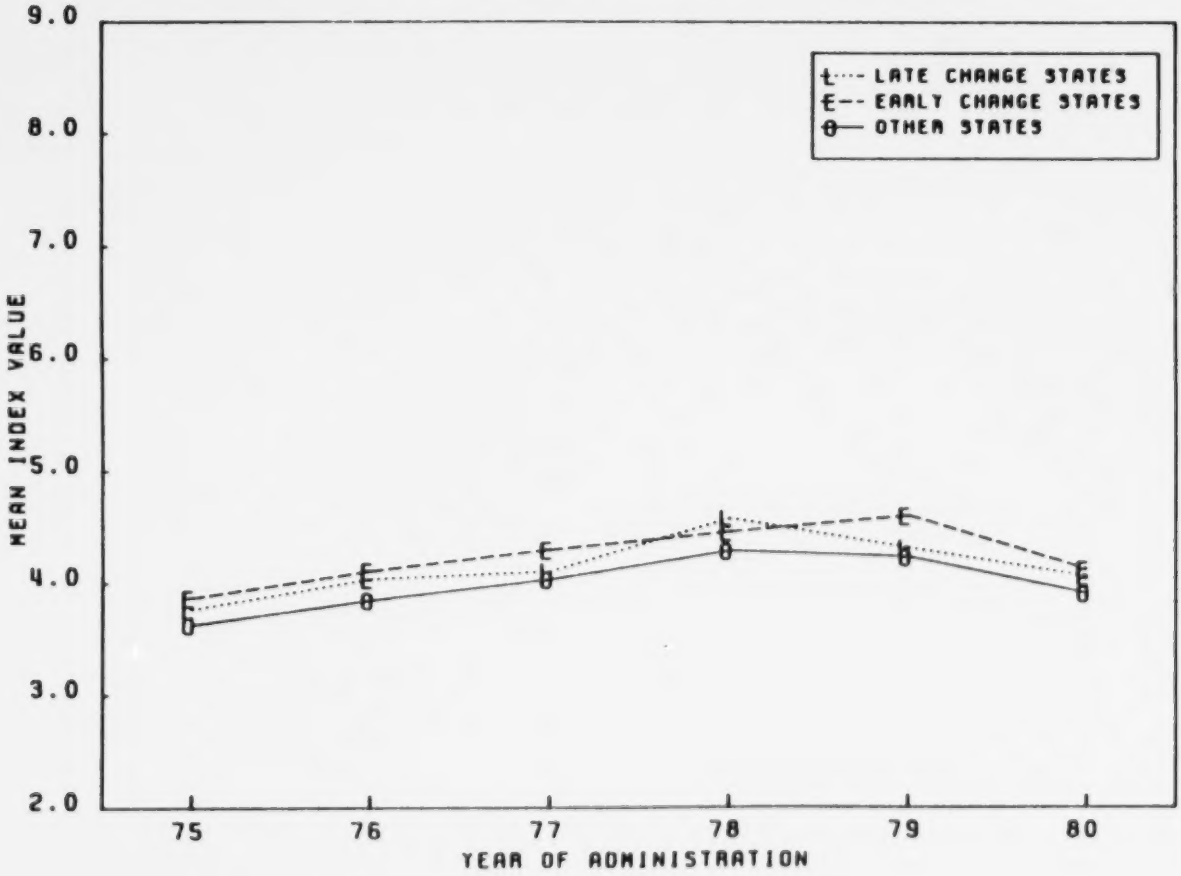


FIGURE 14

PERCEIVED AVAILABILITY OF MARIJUANA (1 TO 5 SCALE)
COMPARISONS ACROSS SENIOR CLASSES

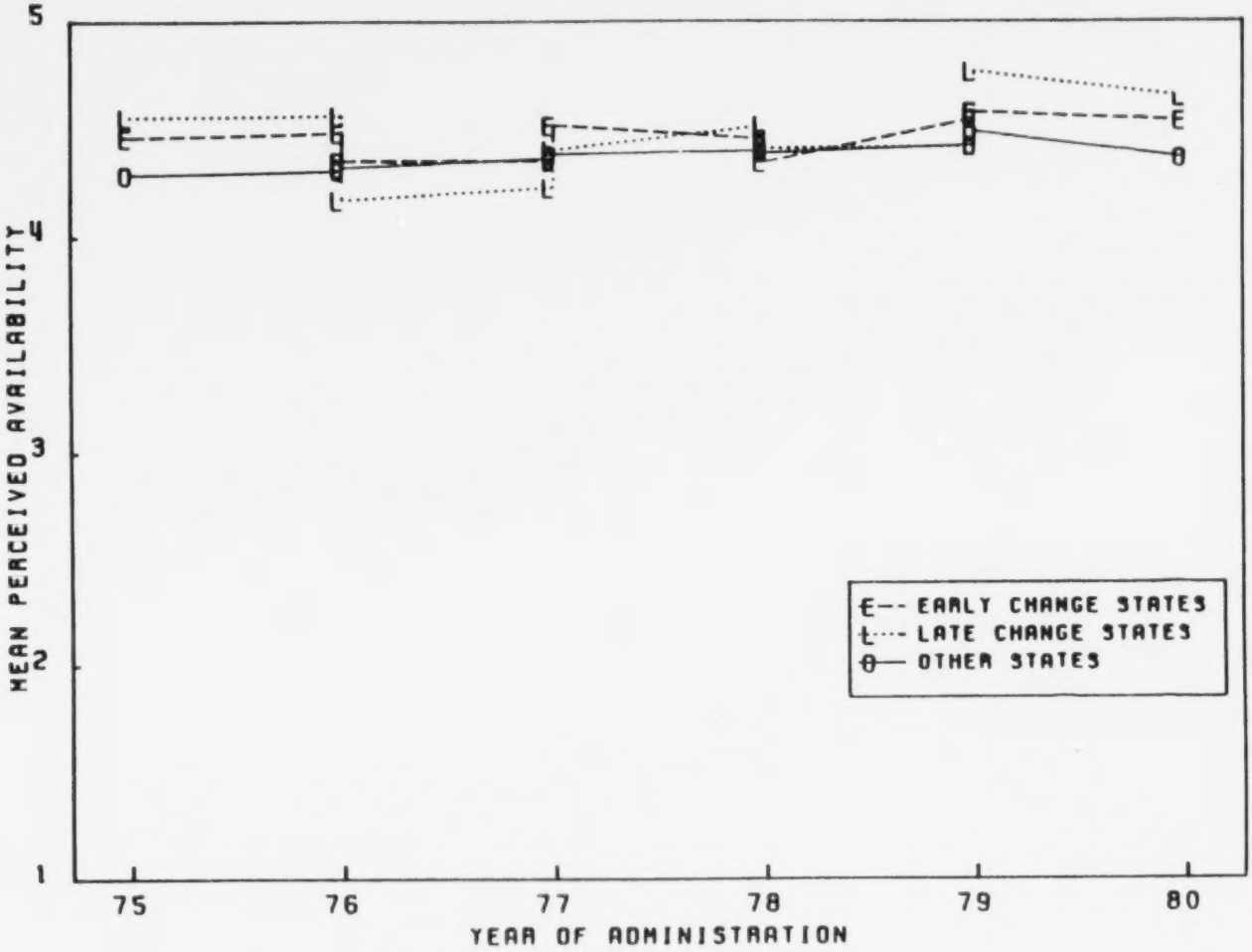


FIGURE 15

RISK FROM USING MARIJUANA INDEX (1 TO 4 SCALE)
COMPARISONS ACROSS SENIOR CLASSES

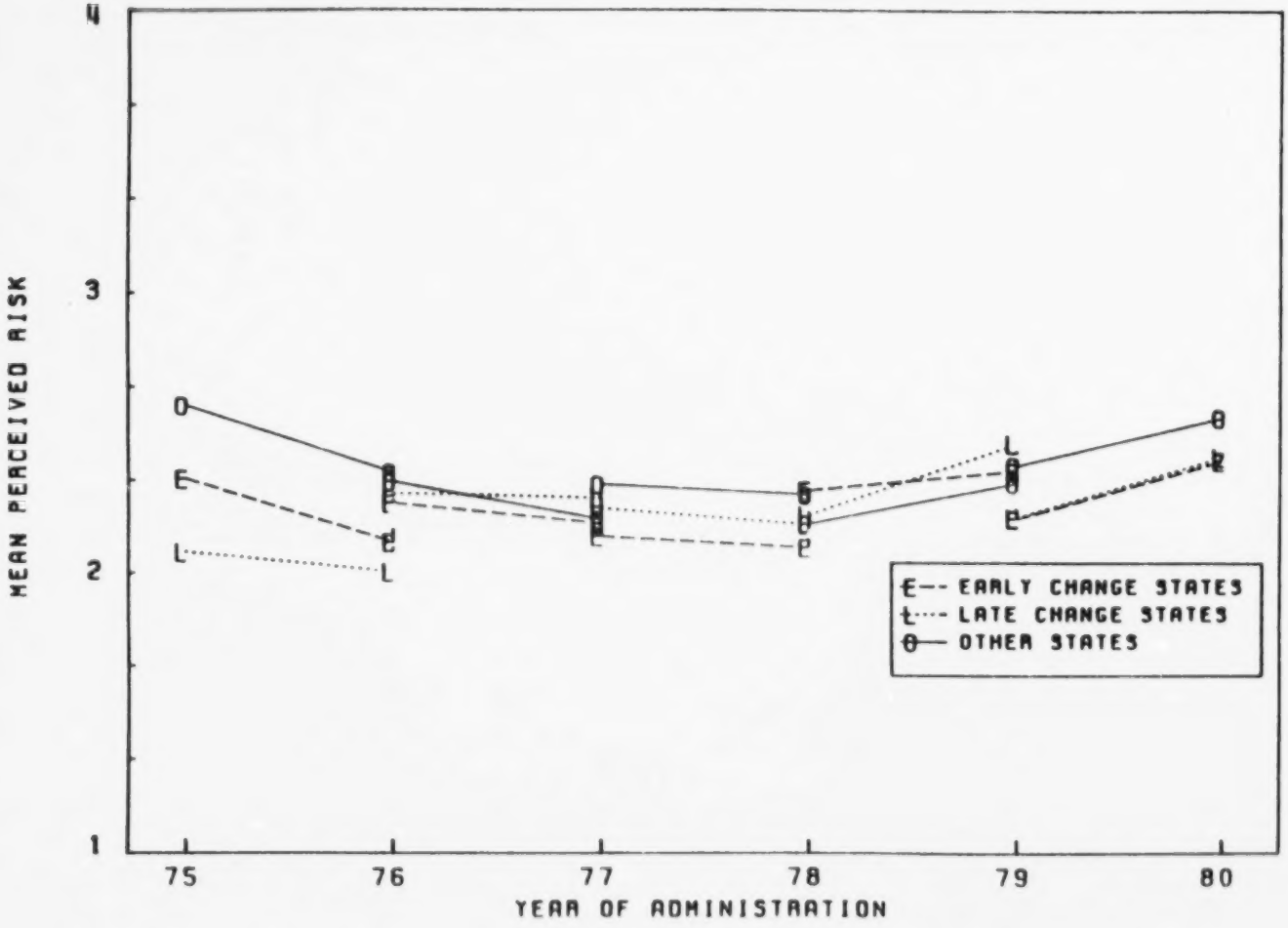


FIGURE 16

DISAPPROVAL OF MARIJUANA USE INDEX (1 TO 3 SCALE)
COMPARISONS ACROSS SENIOR CLASSES

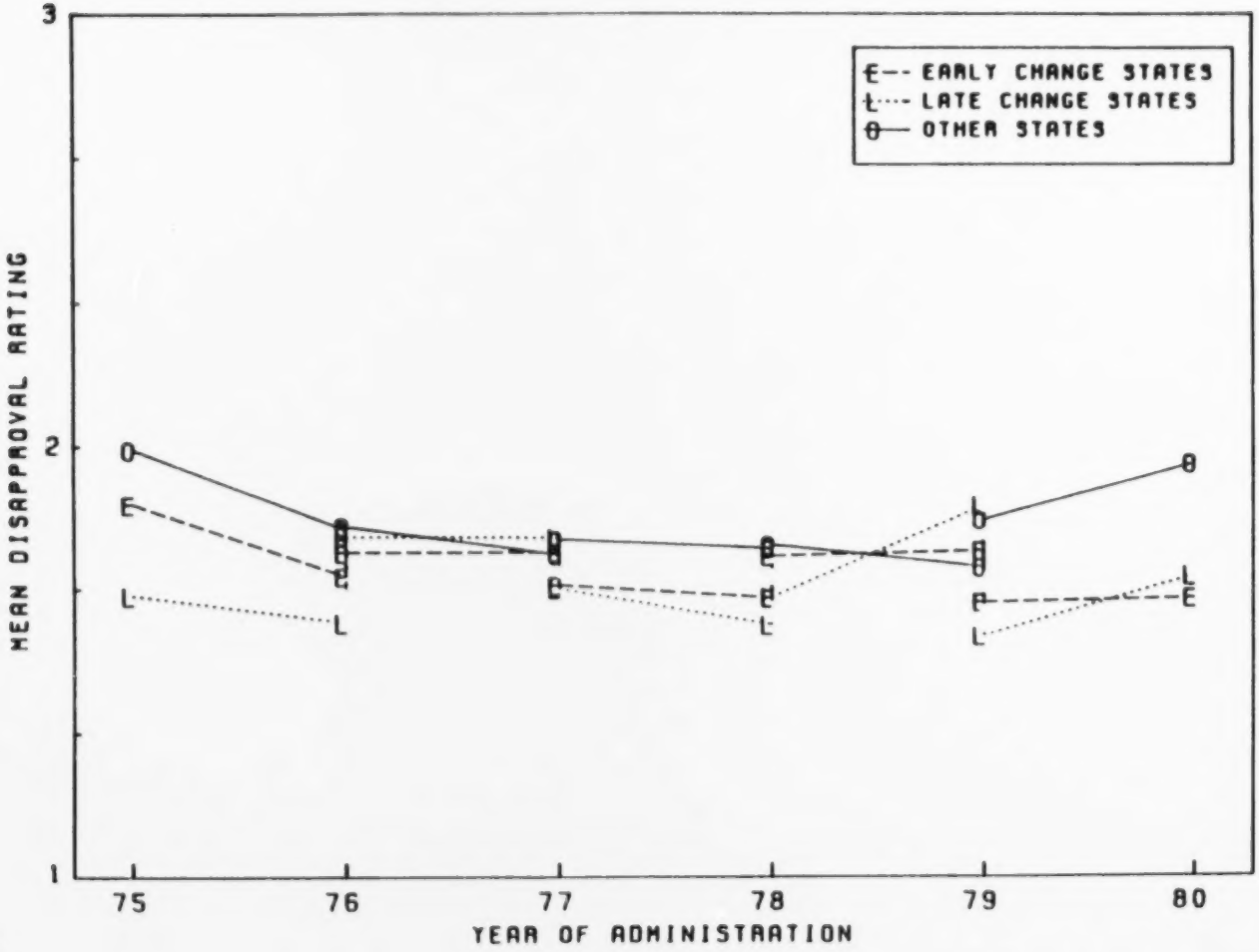


FIGURE 17

KNOWLEDGE OF STATE LAW: COMPARISONS ACROSS SENIOR CLASSES
OF PROPORTIONS WHO SAY 'POSSIBLE JAIL SENTENCE'

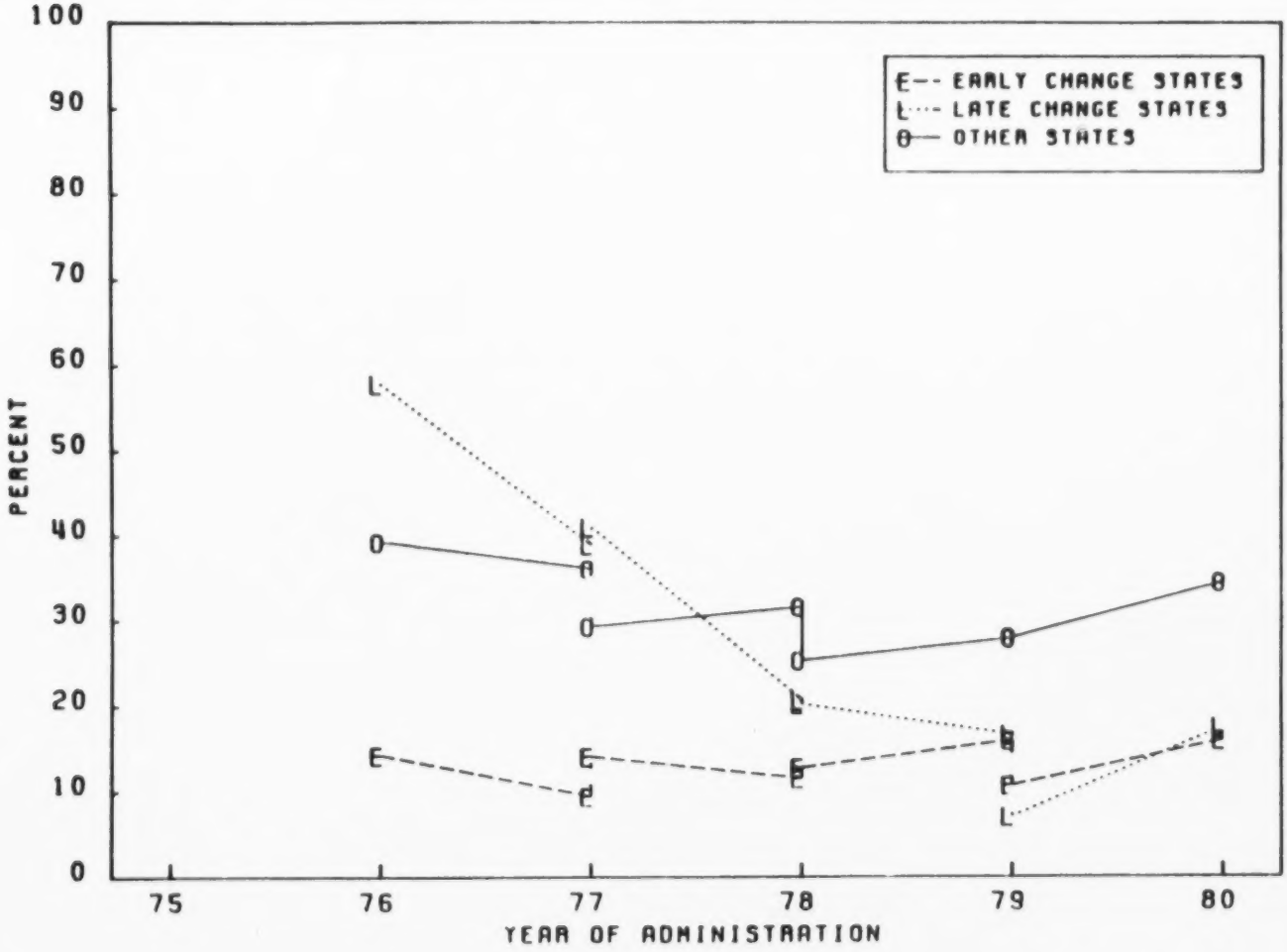


Table 1

Number of Schools and Students Comprising the Representative National Samples, 1975-1980

	Class of 1975	Class of 1976	Class of 1977	Class of 1978	Class of 1979	Class of 1980
Number of public schools	111	108	108	111	111	107
Number of private schools	14	15	16	20	20	20
Total number of schools	125	123	124	131	131	127
Total number of students	15,791	16,678	18,436	18,924	16,662	16,524
Student response rate	78%	77%	79%	83%	82%	82%

Table 2A

Numbers of Schools and Respondents From Each Experimental State
Used in Analyses Comparing Senior Classes

	Number of Schools Participating Both Years					Number of Seniors Responding*				
	75-76	76-77	77-78	78-79	79-80	75-76	76-77	77-78	78-79	79-80
Early Change States										
California	13	15	13	5	6	1112	1813	1189	644	539
Maine	4	4	4	1	1	616	675	661	232	212
Minnesota	2	1	3	0	2	321	194	652	0	223
Ohio	9	11	11	4	3	1127	1581	1366	672	412
Total	28	31	31	10	12	3196	4266	3868	1548	1386
Late Change States										
Mississippi	0	1	0	3	0	0	54	0	112	0
New York	4	4	9	3	4	570	473	1074	517	411
North Carolina	1	2	3	1	0	123	283	640	139	0
Total	5	7	12	7	4	693	810	1711	794	411

*This number is the sum across schools of the lower of the number of seniors responding in either year. It corresponds to the number of cases used in the analyses presented in Tables 3 through 7.

Table 28

Number of Weighted Cases from Each Experimental State Used in Panel Analyses

	Class of '75 Panels				Class of '76 Panels			
	75-77	75-78	75-79	75-80	76-77	76-78	76-79	76-80
Early Change States								
California	495	152	44	30	357	64	63	48
Maine	223	87	10	8	75	19	14	17
Minnesota	34	11	6	11	72	18	12	15
Ohio	512	171	61	49	238	47	55	44
Total	1264	421	121	98	742	148	144	124
Late Change States								
Mississippi	13	4	8	4	20	9	4	8
New York	116	33	37	29	276	66	58	54
North Carolina	93	30	26	26	135	34	40	30
Total	222	67	71	59	431	109	102	92

Note: Weighting was used to reduce the proportional contribution of the small, oversampled drug-using stratum.

Entries correspond to the numbers of cases used in the analyses presented in Tables 9 to 13 prior to deletions for missing data on the dependent variable. The 1975 panel, surveyed before the questionnaires were shortened, had higher rates of deletion due to more missing data in senior year.

Table 3

Lifetime Prevalence: Changes Across Senior Classes for Five One-Year Intervals

Senior Classes Being Compared	Group	N Schools	Wtd N Students	Earlier Class		Later Class		Mean Change	Net Gain/Loss relative to Control States*
				Mean	Std Dev	Mean	Std Dev		
1975-1976	Early Change	28	3196	.559		.600		.042	-.020
	Late Change	5	693	.558		.623		.065	.003
	Control States	38	4081	.444		.507		.062	
	Total	71	7970	.500	.500	.554	.497	.054	
1976-1977	Early Change	31	4266	.569		.602		.033	.005
	Late Change	7	810	.530		.541		.011	-.017
	Control States	41	5290	.548		.577		.028	
	Total	79	10366	.555	.497	.584	.493	.029	
1977-1978	Early Change	31	3868	.623		.641		.018	-.007
	Late Change	12	1714	.575		.606		.031	.006
	Control States	41	5570	.565		.590		.025	
	Total	84	11152	.587	.492	.610	.488	.023	
1978-1979	Early Change	10	1548	.578		.611		.033	.015
	Late Change	7	794	.603		.622		.019	.001
	Control States	47	5684	.617		.634		.018	
	Total	64	8026	.608	.488	.629	.483	.021	
1979-1980	Early Change	12	1386	.695		.680		-.016	-.022
	Late Change	4	411	.691		.673		-.018	-.024
	Control States	32	3711	.597		.603		.006	
	Total	48	5508	.629	.483	.628	.483	-.001	

*These entries are the mean change for the experimental states minus the mean change for the control states

Table 4

Annual Prevalence: Changes Across Senior Classes for Five One-Year Intervals

Senior Classes Being Compared	Group	N Schools	Wtd N Students	Earlier Class		Later Class		Mean Change	Net Gain/Loss relative to Control States*
				Mean	Std Dev	Mean	Std Dev		
1975-1976	Early Change	28	3196	.463		.520		.057	.016
	Late Change	5	693	.495		.558		.063	.022
	Control States	38	4081	.380		.421		.041	
	Total	71	7970	.423	.494	.473	.499	.049	
1976-1977	Early Change	31	4266	.496		.520		.024	.006
	Late Change	7	810	.435		.454		.019	.001
	Control States	41	5290	.463		.481		.018	
	Total	79	10366	.474	.499	.495	.500	.021	
1977-1978	Early Change	31	3868	.527		.541		.014	-.015
	Late Change	12	1714	.486		.531		.046	.017
	Control States	41	5570	.471		.499		.029	
	Total	84	11152	.493	.500	.519	.500	.026	
1978-1979	Early Change	10	1548	.484		.534		.050	.039
	Late Change	7	794	.516		.515		-.001	-.012
	Control States	47	5684	.519		.532		.011	
	Total	64	8026	.512	.500	.531	.499	.017	
1979-1980	Early Change	12	1386	.609		.561		-.048	-.044
	Late Change	4	411	.585		.559		-.019	-.015
	Control States	32	3711	.501		.497		-.004	
	Total	48	5508	.534	.499	.517	.500	-.016	

*These entries are the mean change for the experimental state minus the mean change for the control states

Table 5

Monthly Prevalence: Changes Across Senior Classes for Five One-Year Intervals

Senior Classes Being Compared	Group	N Schools	Wtd N Students	Earlier Class		Later Class		Mean Change	Net Gain/Loss relative to Control States*
				Mean	Std Dev	Mean	Std Dev		
1975-1976	Early Change	28	3196	.335		.389		.054	.003
	Late Change	5	693	.349		.404		.055	-.002
	Control States	38	4081	.249		.306		.057	
	Total	71	7970	.292	.455	.348	.476	.056	
1976-1977	Early Change	31	4266	.367		.390		.023	-.004
	Late Change	7	810	.317		.350		.033	.006
	Control States	41	5290	.334		.361		.027	
	Total	79	10366	.346	.476	.372	.483	.026	
1977-1978	Early Change	31	3868	.391		.401		.010	-.005
	Late Change	12	1714	.361		.413		.052	.037
	Control States	41	5570	.351		.366		.015	
	Total	84	11152	.366	.482	.385	.487	.019	
1978-1979	Early Change	10	1548	.364		.389		.025	.017
	Late Change	7	794	.409		.389		-.020	-.028
	Control States	47	5684	.381		.389		.008	
	Total	64	8026	.381	.486	.389	.488	.009	
1979-1980	Early Change	12	1386	.438		.401		-.039	-.023
	Late Change	4	411	.415		.378		-.041	-.025
	Control States	32	3711	.356		.341		-.016	
	Total	48	5508	.381	.486	.359	.480	-.023	

*These entries are the mean change for the experimental state minus the mean change for the control states

Table 6

Daily Prevalence: Changes Across Senior Classes for Five One-Year Intervals

Senior Classes Being Compared	Group	N Schools	Wtd N Students	Earlier Class		Later Class		Mean Change	Net Gain/Loss relative to Control States**
				Mean	Std Dev	Mean	Std Dev.		
1975-1976	Early Change	28	3196	.087		.105		.018	.005
	Late Change	5	693	.068		.093		.025	.012
	Control States	38	4081	.061		.074		.013	
	Total	71	7970	.072	.258	.088	.283	.016	
1976-1977	Early Change	31	4266	.099		.107		.008	- .005
	Late Change	7	810	.081		.074		- .008	- .021
	Control States	41	5290	.087		.099		.013	
	Total	79	10366	.091	.288	.100	.300	.009	
1977-1978	Early Change	31	3868	.110		.113		.002	- .013
	Late Change	12	1714	.080		.127		.047	.032*
	Control States	41	5570	.093		.108		.015	
	Total	84	11152	.097	.296	.113	.317	.016	
1978-1979	Early Change	10	1548	.090		.109		.019	.019
	Late Change	7	794	.116		.104		- .012	- .012
	Control States	47	5684	.114		.114		.0004	
	Total	64	8026	.110	.313	.112	.315	.003	
1979-1980	Early Change	12	1386	.120		.110		- .011	- .009
	Late Change	4	411	.074		.096		.022	.024
	Control States	32	3711	.097		.095		- .002	
	Total	48	5508	.101	.301	.099	.299	- .003	

*t-test for differences significant at the .05 level, 2-tailed

**These entries are the mean change for the experimental state minus the mean change for the control states.

Table 7

Frequency Index (2-11): Changes Across Senior Classes for Five One-Year Intervals

Senior Classes Being Compared	Group	N Schools	Wtd N Students	Earlier Class		Later Class		Mean Change	Net Gain/Loss relative to Control States*
				Mean	Std Dev	Mean	Std Dev		
1975-1976	Early Change	28	3196	4.056		4.438		.282	.020
	Late Change	5	693	4.084		4.398		.314	.052
	Control States	38	4081	3.542		3.804		.262	
	Total	71	7970	3.795	2.676	1.070	2.843	.275	
1976-1977	Early Change	31	4266	4.187		4.321		.134	.002
	Late Change	7	810	3.924		3.935		.011	-.121
	Control States	41	5290	3.992		4.124		.132	
	Total	79	10366	4.067	2.826	4.190	2.899	.123	
1977-1978	Early Change	31	3868	4.351		4.458		.106	-.085
	Late Change	12	1714	4.060		4.471		.412	.221
	Control States	41	5570	4.055		4.247		.191	
	Total	84	11152	4.159	2.882	4.354	2.996	.196	
1978-1979	Early Change	10	1548	4.095		4.351		.257	.195
	Late Change	7	791	4.465		4.313		-.152	-.214
	Control States	47	5684	4.349		4.412		.062	
	Total	64	8026	4.312	2.984	4.390	2.981	.079	
1979-1980	Early Change	12	1386	4.670		4.470		-.199	-.157
	Late Change	4	411	4.364		4.388		.025	.067
	Control States	32	3711	4.177		4.134		-.042	
	Total	48	5508	4.135	2.906	4.238	2.823	.076	

*These entries are the mean change for the experimental state minus the mean change for the control states

Table 8

Adjusted Estimates of Annual Prevalence and Frequency of Marijuana Use Across Senior Classes from 1975 through 1980

	Annual Prevalence					
	1975	1976	1977	1978	1979	1980
Control States: Summary Estimate	39.7	43.2	46.9	50.5	49.9	46.6
Early-Change States: Cumulative Gain/Loss	--	+1.6	+2.2	+0.7	+4.6	+0.2
Summary Estimate[a]	42.8	47.9	52.2	54.3	57.6	49.9
Late-Change States: Cumulative Gain/Loss	--	+2.2	+2.3	+4.0	+2.8	+1.3
Summary Estimate[b]	41.0	46.7	50.5	55.8	54.0	49.2

	1975	1976	1977	1978	1979	1980
Control States: Summary Estimate	3.63	3.85	4.04	4.29	4.23	3.91
Early-Change States: Cumulative Gain/Loss	--	+.02	+.02	-.06	+.13	-.03
Summary Estimate[c]	3.87	4.11	4.30	4.47	4.60	4.12
Late-Change States: Cumulative Gain/Loss	--	+.05	-.07	+.15	-.06	+.01
Summary Estimate[d]	3.77	4.04	4.11	4.58	4.31	4.06

[a]Each summary estimate in this row is computed by combining the summary estimate for the control states, the cumulative gain/loss, and a constant ("starting point") of +3.1.

[b]Computed as above, except that the constant for this row is +1.3.

[c]Computed as above, except that the constant for this row is +0.24.

[d]Computed as above, except that the constant for this row is +0.14.

Table 9

Lifetime Prevalence: Panel Changes Across All Intervals

Class and Panel Interval	Group	N	Weighted N	Class of 1975 and Class of 1976 Panels						Net Gain/Loss relative to control states*	Etaadj) on change for 3 groups
				Senior Year		Last follow Up		Change			
				Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
1975-77	Early Change	1015	1015	496		620		121		003	
	Late Change	165	132	383		567		181		057	
	Control States	1338	1009	420		546		127			
	Total	2518	2156	453	498	582	493	129	377		022
1976-77	Early Change	713	498	496		554		058		007	
	Late Change	404	330	508		573		065		000	
	Control States	2494	1991	456		521		065			
	Total	3611	2819	469	499	533	499	064	339		0 0
1975-78	Early Change	318	318	478		638		160		010	
	Late Change	49	38	425		558		133		037	
	Control States	361	279	464		633		170			
	Total	728	635	468	499	631	483	163	424		0 0
1976-78	Early Change	136	104	458		580		122		029	
	Late Change	102	81	549		697		148		003	
	Control States	565	440	472		623		151			
	Total	803	626	480	500	625	484	145	410		0 0
1975-79	Early Change	102	77	491		717		226		097	
	Late Change	43	32	442		653		211		082	
	Control States	378	293	480		608		129			
	Total	523	401	479	500	633	483	154	413		071
1976-79	Early Change	141	106	562		719		158		005	
	Late Change	88	66	500		727		227		074	
	Control States	564	438	508		661		153			
	Total	793	610	517	500	679	467	162	424		0 0
1975-80	Early Change	76	57	343		570		227		007	
	Late Change	42	34	422		598		176		044	
	Control States	319	248	454		674		220			
	Total	437	340	432	496	649	478	217	438		0 0
1976-80	Early Change	112	85	417		622		205		004	
	Late Change	85	69	512		696		184		017	
	Control States	506	397	466		667		201			
	Total	703	551	464	499	664	473	200	453		0 0

*These entries are the mean change for the experimental states minus the mean change for the control states

Table 10

Annual Prevalence: Panel Changes Across All Intervals

Class and Panel Interval	Group	N	Weighted N	Class of 1975 and Class of 1976 Panels						Net Gain/Loss relative to control states*	Eta(adj) on change for 3 groups
				Senior Year		Last Follow-Up		Change			
				Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
1975-77	Early Change	1002	1002	415		511		096		011	
	Late Change	164	131	300		434		134		049	
	Control States	1325	999	333		418		085			
	Total	2491	2132	369	483	462	499	093	461		0 0
1976-77	Early Change	704	491	419		466		047		000	
	Late Change	401	327	425		482		057		010	
	Control States	2474	1977	382		429		047			
	Total	3579	2795	394	489	442	497	048	402		0 0
1975-78	Early Change	314	314	395		478		083		009	
	Late Change	48	37	373		436		064		- 010	
	Control States	363	281	381		454		074			
	Total	725	632	387	487	465	499	078	492		0 0
1976-78	Early Change	131	100	381		428		047		- 056	
	Late Change	103	82	478		559		081		- 022	
	Control States	563	441	414		517		103			
	Total	797	623	417	493	508	500	091	462		0 0
1975-79	Early Change	101	76	328		476		148		126	
	Late Change	43	32	379		432		053		031	
	Control States	376	291	414		436		022			
	Total	520	399	395	489	443	497	048	522		0 0
1976-79	Early Change	139	104	514		585		071		- 004	
	Late Change	87	66	376		503		127		052	
	Control States	560	434	428		503		075			
	Total	786	603	437	496	517	500	080	513		0 0
1975-80	Early Change	74	56	256		357		101		090	
	Late Change	40	33	357		469		112		101	
	Control States	320	249	370		381		011			
	Total	434	338	350	478	386	487	036	498		0 0
1976-80	Early Change	109	82	348		409		061		- 002	
	Late Change	85	69	410		512		072		009	
	Control States	502	395	401		465		063			
	Total	696	546	398	490	462	499	064	522		0 0

*These entries are the mean change for the experimental state minus the mean change for the control states

Table 11

Monthly Prevalence: Panel Changes Across All Intervals

Class and Panel Interval	Group	N	Weighted N	Class of 1975 and Class of 1976 Panels						Net Gain/Loss relative to control states*	Eta(adj) on change for 3 groups
				Senior Year		Last Follow Up		Change			
				Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
1975-77	Early Change	998	998	269		350		081		001	
	Late Change	166	132	236		312		076		009	
	Control States	1327	1001	200		285		085			
	Total	2491	2131	219	111	302	459	082	442		0 0
1976-77	Early Change	704	494	267		333		066		028	
	Late Change	403	328	294		357		063		025	
	Control States	2465	1969	260		298		038			
	Total	3572	2791	265	442	311	463	046	421		013
1975-78	Early Change	313	313	281		335		051		- 054	
	Late Change	48	37	336		309		027		- 132	
	Control States	362	280	227		332		105			
	Total	723	630	262	440	332	471	070	485		017
1976-78	Early Change	133	100	243		372		130		074	
	Late Change	103	82	332		356		024		032	
	Control States	564	439	301		357		056			
	Total	800	622	296	457	360	480	064	479		030
1975-79	Early Change	102	77	213		361		148		133*	
	Late Change	43	32	263		242		021		- 036	
	Control States	372	289	283		298		015			
	Total	517	398	268	443	306	461	038	472		092
1976-79	Early Change	139	104	387		447		061		002	
	Late Change	87	65	267		400		133		074	
	Control States	562	434	272		331		059			
	Total	788	603	291	455	359	480	067	489		0 0
1975-80	Early Change	75	57	187		199		012		- 065	
	Late Change	40	33	316		276		041		- 118	
	Control States	319	248	211		287		077			
	Total	434	338	217	413	271	445	054	468		033
1976-80	Early Change	108	81	207		314		107		051	
	Late Change	85	69	295		401		106		050	
	Control States	503	394	284		340		056			
	Total	696	544	274	446	344	475	070	502		0 0

*These entries are the mean change for the experimental state minus the mean change for the control states

Table 12

Daily Prevalence: Panel Changes Across All Intervals

Class and Panel Interval	Group	N	Weighted N	Class of 1975 and Class of 1976 Panels						Net Gain/Loss relative to control states**	Eta(adj.) on change for 3 groups
				Senior Year		Last Follow-Up		Change			
				Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
1975-77	Early Change	998	998	059		085		026		004	
	Late Change	166	132	025		064		039		017	
	Control States	1327	1001	040		062		022			
	Total	2491	2131	048	214	073	260	025	255		0.0
1976-77	Early Change	704	494	059		081		022		-.002	
	Late Change	403	328	063		081		018		-.006	
	Control States	2465	1969	050		074		024			
	Total	3572	2791	053	225	076	265	023	258		0.0
1975-78	Early Change	313	313	077		099		022		-.007	
	Late Change	48	37	064		082		018		-.011	
	Control States	362	280	051		080		029			
	Total	723	630	065	246	089	286	025	295		0.0
1976-78	Early Change	133	100	090		106		017		-.021	
	Late Change	103	82	049		093		045		007	
	Control States	564	439	074		112		038			
	Total	800	622	073	260	108		035	322		0.0
1975-79	Early Change	102	77	070		091		022		-.022	
	Late Change	43	32	074		095		021		-.023	
	Control States	372	289	065		108		044			
	Total	517	398	066	249	104	305	038	319		0.0
1976-79	Early Change	139	104	083		192		109		078*	
	Late Change	87	65	123		159		036		005	
	Control States	562	434	062		094		031			
	Total	788	603	072	259	118	322	045	349		060
1975-80	Early Change	75	57	064		047		-.018		-.049	
	Late Change	40	33	061		051		-.010		-.041	
	Control States	319	248	047		078		031			
	Total	434	338	051	221	070	255	019	282		0.0
1976-80	Early Change	108	81	083		116		033		-.013	
	Late Change	85	69	053		097		043		-.003	
	Control States	503	394	071		117		046			
	Total	696	544	070	256	114	318	044	330		0.0

*t-test for differences significant at the .05 level, 2-tailed

**These entries are the mean change for the experimental state minus the mean change for the control states

Table 13

Frequency Index (2-11): Panel Changes Across All Intervals

Class and Panel Interval	Group	N	Weighted N	Class of 1975 and Class of 1976 Panels						Net Gain/Loss relative to control states**	Eta(adj.) on change for 3 groups
				Senior Year		Last Follow Up		Change			
				Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
1975-77	Early Change	997	997	3.599		4.190		.591		.148	
	Late Change	163	130	3.098		3.726		.628		.185*	
	Control States	1318	994	3.274		3.717		.443			
	Total	2478	2122	3.416	2.403	3.940	2.735	.524	2.003		.022
1976-77	Early Change	698	489	3.601		4.076		.471		.161*	
	Late Change	400	326	3.727		4.104		.377		.064	
	Control States	2450	1962	3.495		3.908		.313			
	Total	3548	2777	3.541	2.488	3.890	2.741	.349	1.826		.020
1975-78	Early Change	314	314	3.771		4.153		.382		-.116	
	Late Change	48	37	3.900		4.100		.200		-.298	
	Control States	361	279	3.487		3.986		.498			
	Total	723	630	3.653	2.615	4.076	2.871	.423	2.399		0.0
1976-78	Early Change	131	100	3.488		4.067		.579		-.055	
	Late Change	102	81	3.918		4.357		.439		.195	
	Control States	557	436	3.705		4.339		.634			
	Total	790	617	3.698	2.646	4.297	2.971	.599	2.434		0.0
1975-79	Early Change	101	76	3.253		4.245		.991		.642*	
	Late Change	43	32	3.811		3.726		.084		.433	
	Control States	372	289	3.727		4.076		.349			
	Total	516	397	3.643	2.634	4.081	2.986	.438	2.640		.086
1976-79	Early Change	138	103	4.190		5.177		.987		.396	
	Late Change	86	65	3.918		4.500		.582		.009	
	Control States	554	431	3.653		4.245		.591			
	Total	778	599	3.775	2.667	4.433	3.075	.659	2.627		0.0
1975-80	Early Change	74	56	3.304		3.298		-.006		-.370	
	Late Change	40	33	3.694		3.816		.122		-.242	
	Control States	318	247	3.395		3.759		.364			
	Total	432	336	3.409	2.432	3.688	2.661	.279	2.483		0.0
1976-80	Early Change	109	82	3.356		4.008		.652		.021	
	Late Change	85	69	3.841		4.203		.362		-.269	
	Control States	498	392	3.640		4.270		.631			
	Total	692	543	3.622	2.621	4.222	3.021	.600	2.750		0.0

*t-test for differences significant at the .05 level, 2-tailed

**These entries are the mean change for the experimental state minus the mean change for the control states

Table 14

Knowledge of State Law: Comparisons Across Senior Classes

Q. *Which best describes the law IN YOUR STATE regarding marijuana? Possession in private of an ounce or less of marijuana (by an adult) is*	Percent							
	1976	1977	1977	1978	1978	1979	1979	1980
Early Change States (law change effective by 4/10/76)								
A criminal offense, carrying a possible jail sentence	14 3	9 5	14 2	11 6	12 9	16 1	10 8	16 1
A criminal offense, carrying a possible fine, but not a jail sentence	14 3	18 3	16 7	19 6	19 6	19 6	18 7	16 4
A non-criminal offense--like a traffic ticket--carrying a small fine and no criminal record at all	33 1	32 6	27 1	25 7	25 0	20 0	28 4	20 6
I don't know if the offense is criminal, but I know it only carries a fine	15 9	12 2	13 9	14 5	12 5	12 9	9 7	10 8
Not a legal offense at all	2 1	5 2	3 1	5 1	2 5	5 5	5 0	3 8
I just don't know	20 5	22 3	25 0	23 5	27 5	25 9	27 3	32 2
N =	435	328	288	311	240	255	278	286
Late Change States (law change effective 7/77)								
	1976	1977	1977	1978	1978	1979	1979	1980]
A criminal offense, carrying a possible jail sentence	57 8	39 0	41 1	20 8	20 3	16 7	7 1	17 6
A criminal offense, carrying a possible fine, but not a jail sentence	15 6	19 5	14 7	15 7	15 8	26 2	21 4	23 1
A non-criminal offense--like a traffic ticket--carrying a small fine and no criminal record at all	1 5	4 5	7 7	24 5	22 6	17 5	27 4	18 7
I don't know if the offense is criminal, but I know it only carries a fine	2 2	3 9	2 7	6 9	18 0	13 5	14 3	16 5
Not a legal offense at all	1 5	1 9	2 3	5 7	5 3	0 0	2 4	2 2
I just don't know	21 5	31 2	31 4	26 4	18 0	26 2	27 4	22 0
N =	135	154	299	159	133	126	84	91
Other States								
	1976	1977	1977	1978	1978	1979	1979	1980
A criminal offense, carrying a posible jail sentence	39 3	36 2	29 4	31 7	25 4	28 0	28 1	34 6
A criminal offense, carrying a possible fine but not a jail sentence	16 1	19 9	20 6	20 5	21 2	20 7	21 9	22 9
A non criminal offense -like a traffic ticket- carrying a small fine and no criminal record at all	4 2	5 2	7 4	8 2	7 9	6 5	8 1	5 2
I don't know if the offense is criminal, but I know it only carries a fine	9 5	7 2	7 5	9 0	12 3	7 7	7 9	5 8
Not a legal offense at all	2 7	2 3	2 8	3 0	3 2	2 6	3 0	1 8
I just don't know	28 4	29 3	32 3	27 5	30 1	34 6	30 9	29 8
N =	861	833	995	1160	1062	975	716	708

Table 15

Cumulative Net Gains/Losses of
Change States on Control States
Across Senior Classes*

Marijuana Use Measure	Early Change States	Late Change States	
	Post Decrim. (1975-1980)	Post Decrim. (1977-1980)	Pre Decrim. (1975-1977)
Lifetime Prevalence	-2.9%	-1.7%	-1.4%
Annual Prevalence	-0.2%	-1.0%	+2.3%
Monthly Prevalence	-1.8%	-1.6%	+0.4%
Daily Prevalence	-0.3%	+4.4%	-0.9%
Frequency-of-Use Index, 2-11 Scale	-.025	+.005	-.069

*These values are obtained by summing the increases/decreases in mean scores across the relevant one-year intervals separately for (a) the relevant group of experimental states, and (b) the control states; and then subtracting the latter sum from the former.

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APPENDIX A

Plots of Changes for Follow-up Panels From the Classes of 1975 and 1976

CONTENTS

Page

1975-1977 and 1976-1977 panels

Lifetime prevalence trends 66
Annual prevalence trends 67
Monthly prevalence trends 68
Daily prevalence trends 69
Frequency-of-use index 70

1975-1978 and 1976-1978 panels

Lifetime prevalence trends 71
Annual prevalence trends 72
Monthly prevalence trends 73
Daily prevalence trends 74
Frequency-of-use index 75

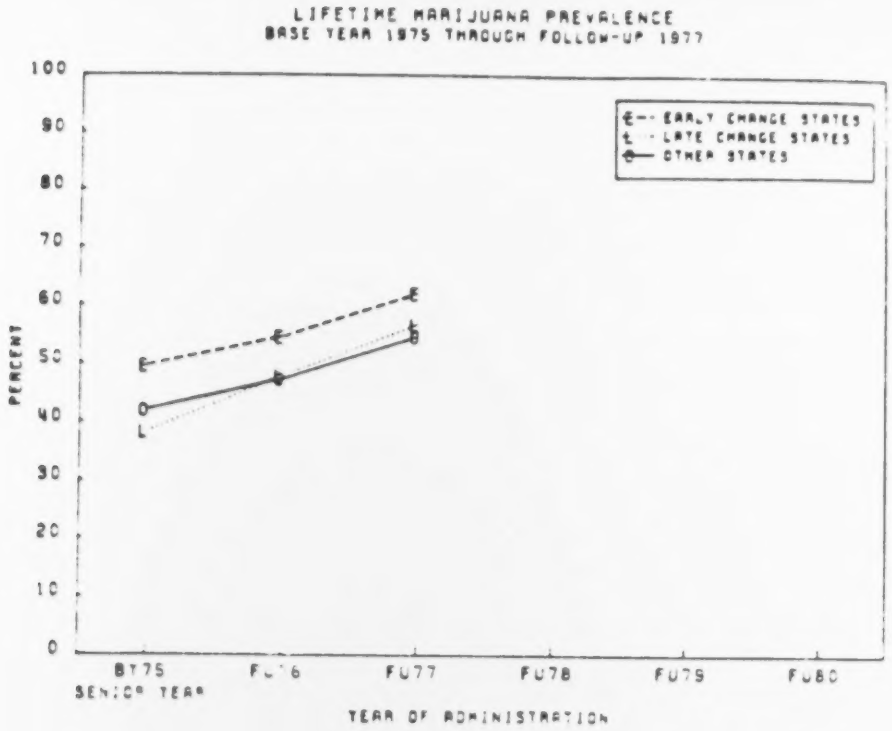
1975-1979 and 1976-1979 panels

Lifetime prevalence trends 76
Annual prevalence trends 77
Monthly prevalence trends 78
Daily prevalence trends 79
Frequency-of-use index 80

1975-1980 and 1976-1980 panels

Lifetime prevalence trends 81
Annual prevalence trends 82
Monthly prevalence trends 83
Daily prevalence trends 84
Frequency-of-use index 85

Figure A-1



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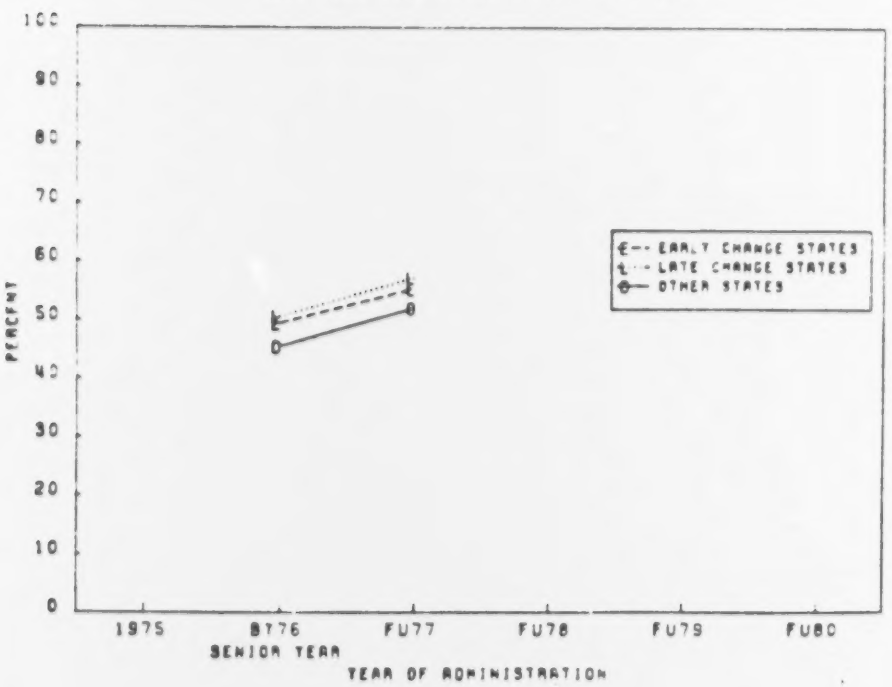

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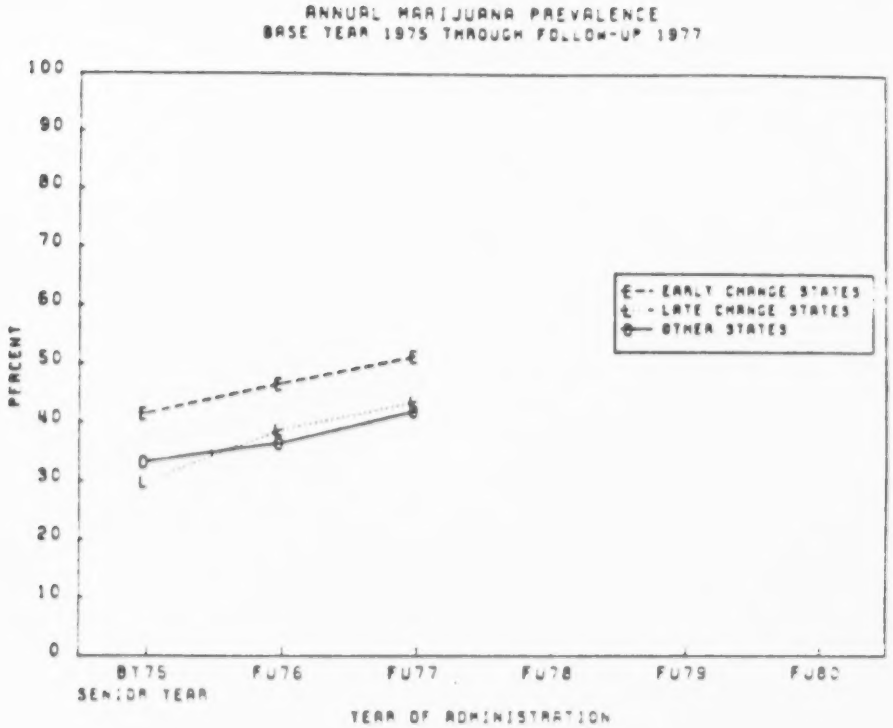

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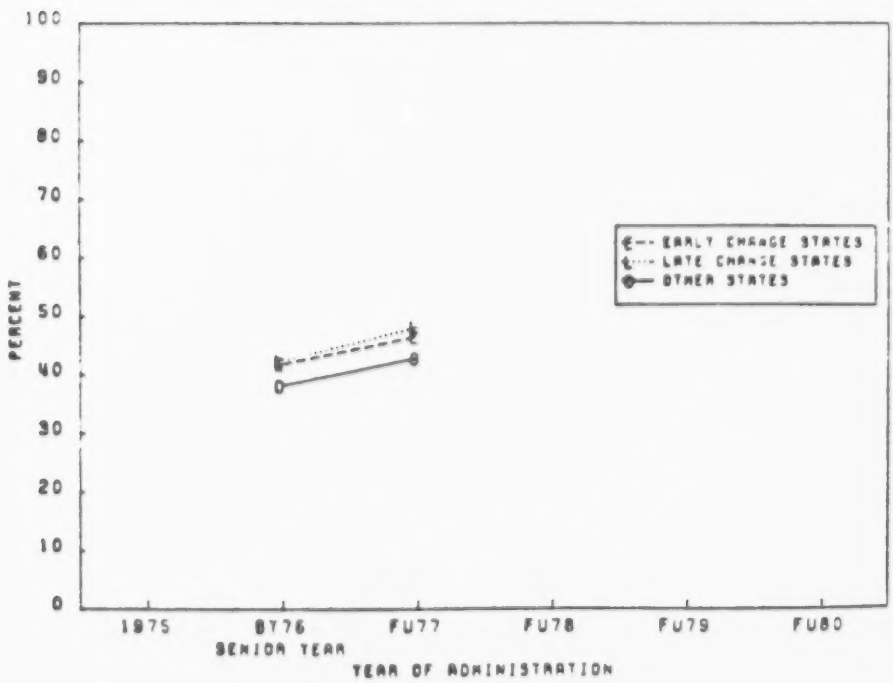

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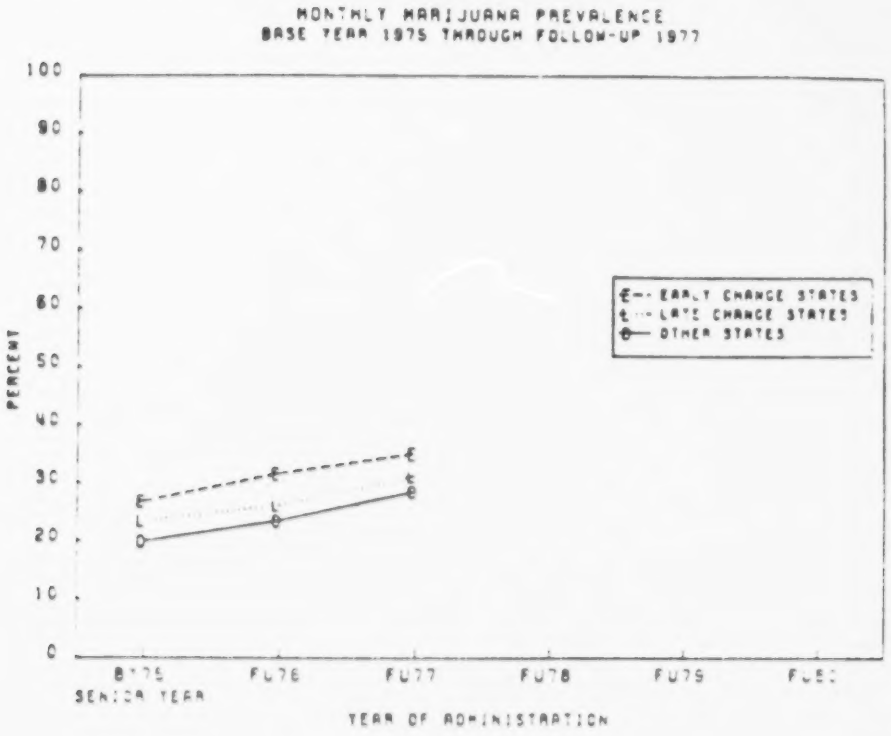

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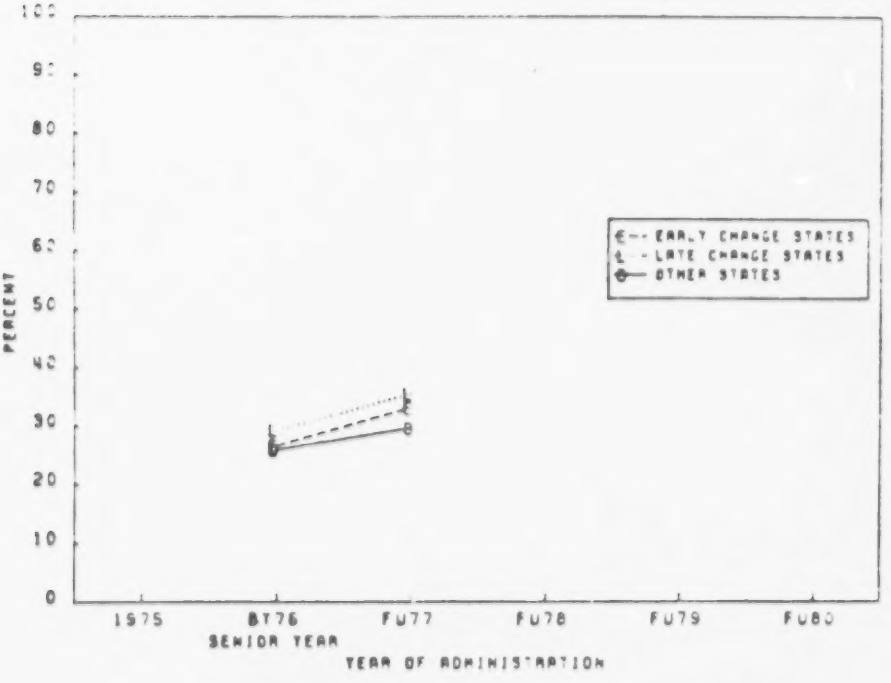

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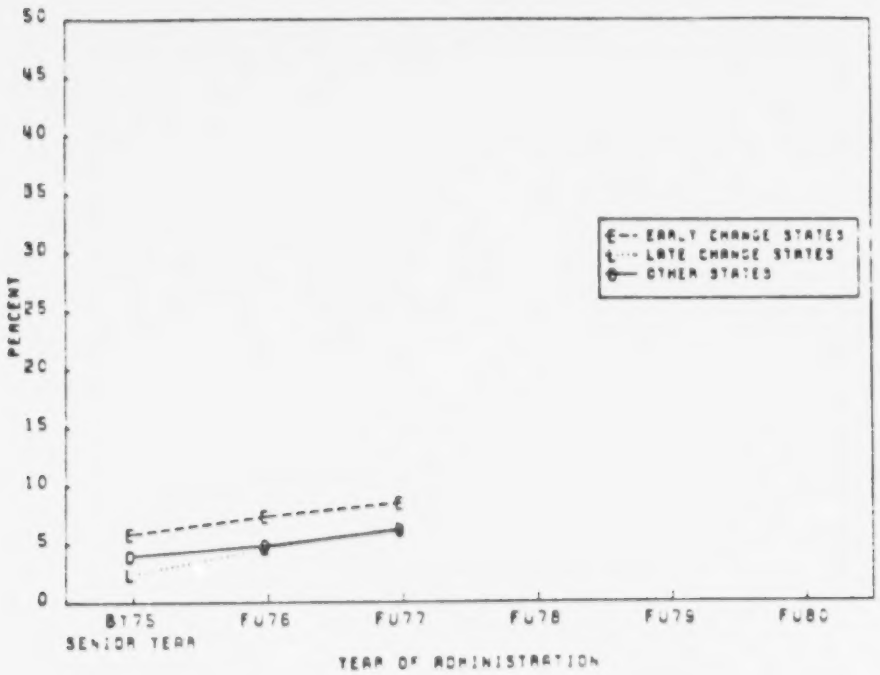
DAILY MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1977



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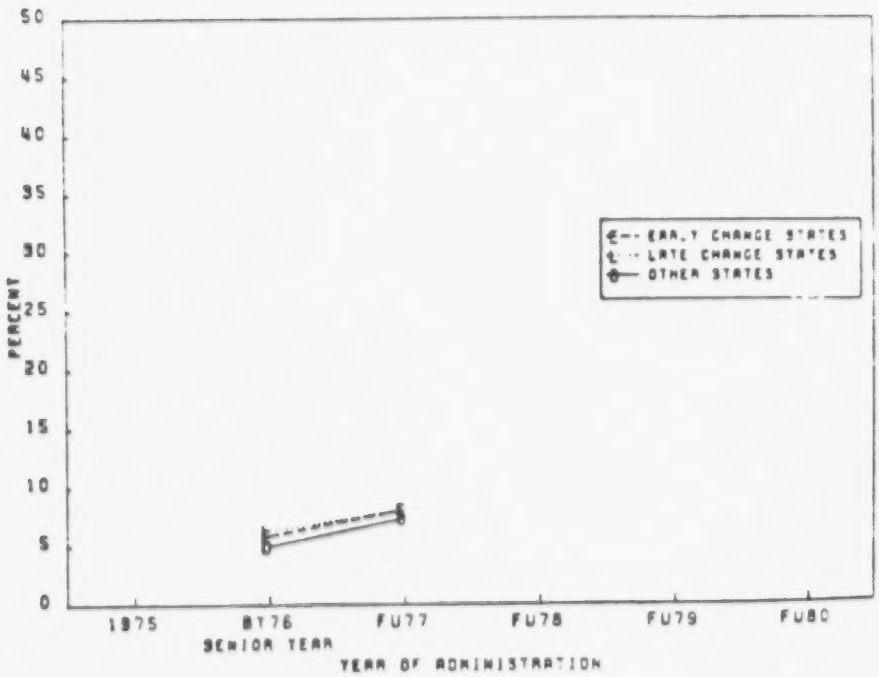

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Figure A-9

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
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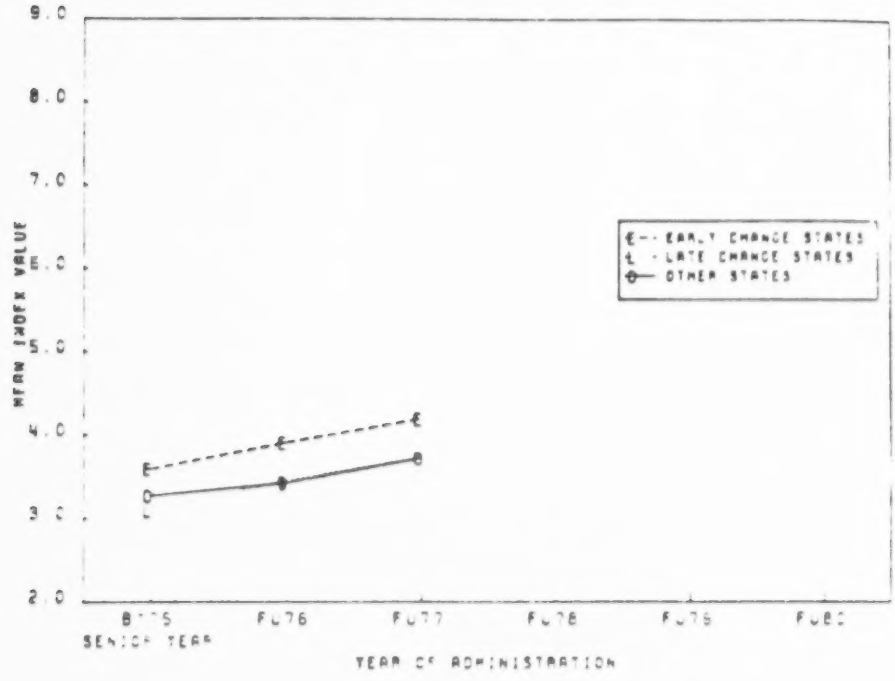

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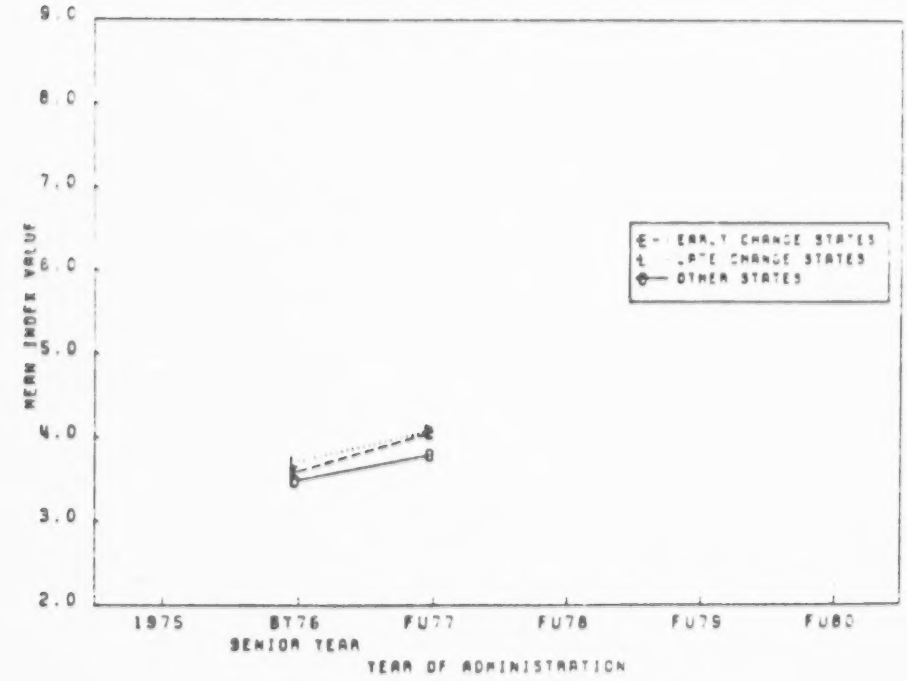

Figure A-11

LIFETIME MARIJUANA PREVALENCE
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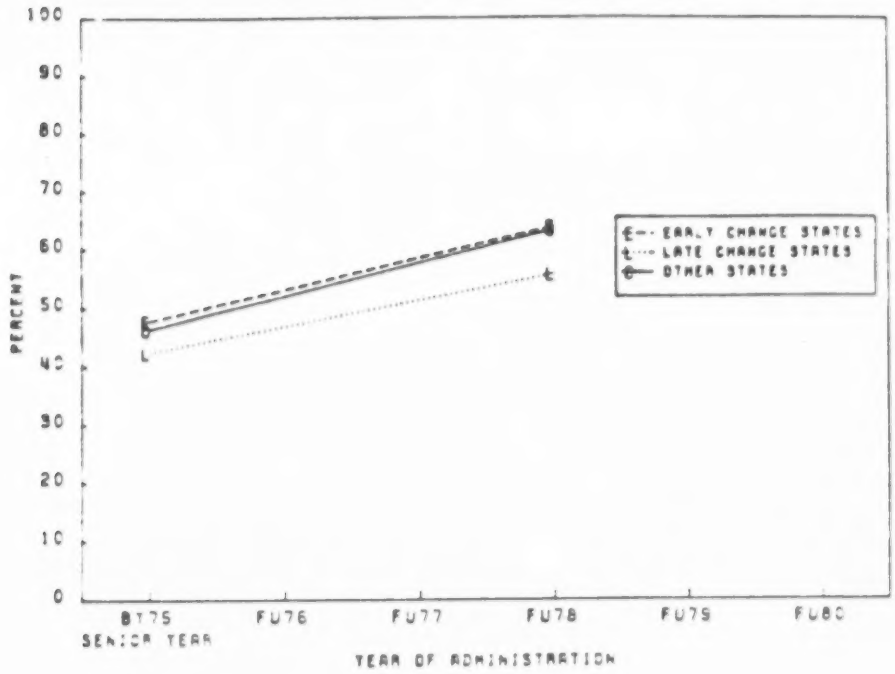

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LIFETIME MARIJUANA PREVALENCE
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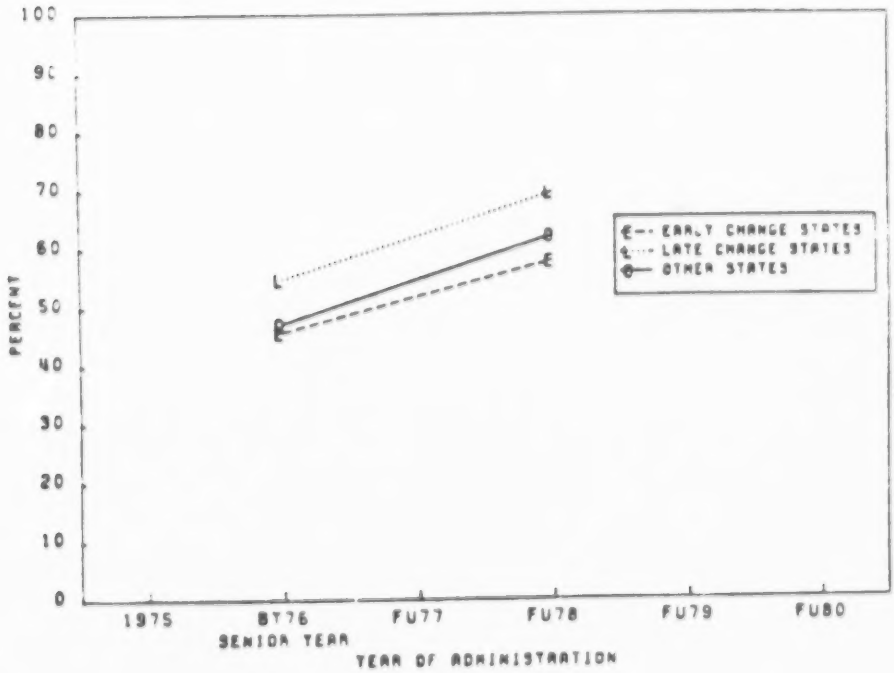

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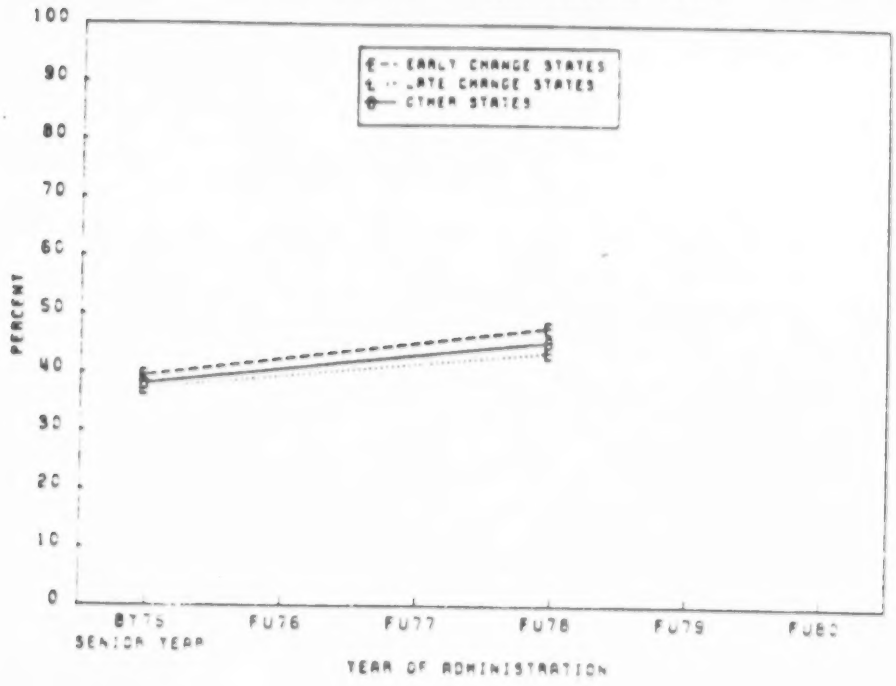
Figure A-13

ANNUAL MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1978



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ANNUAL MARIJUANA PREVALENCE
BASE YEAR 1976 THROUGH FOLLOW-UP 1978

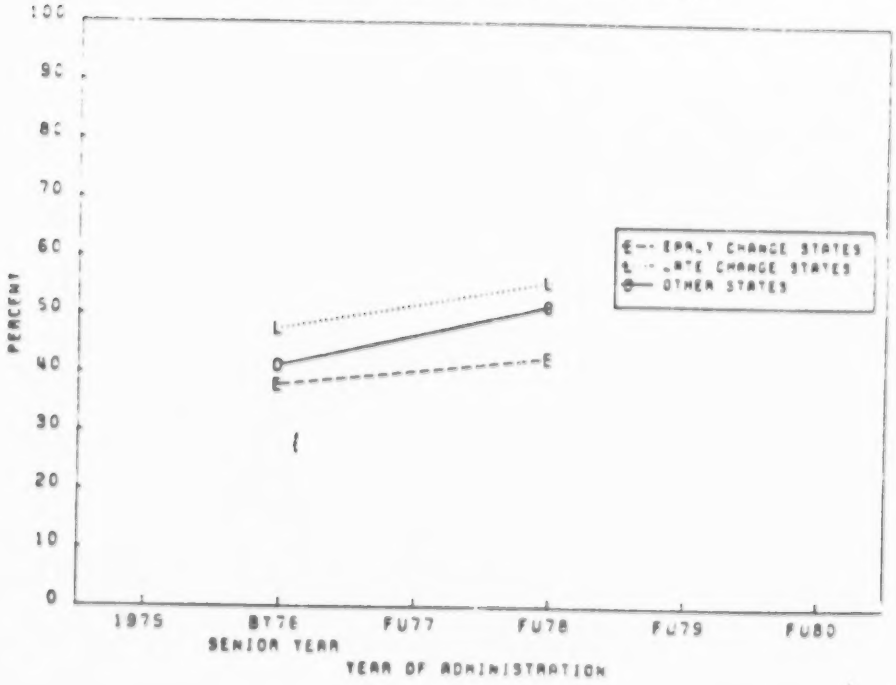
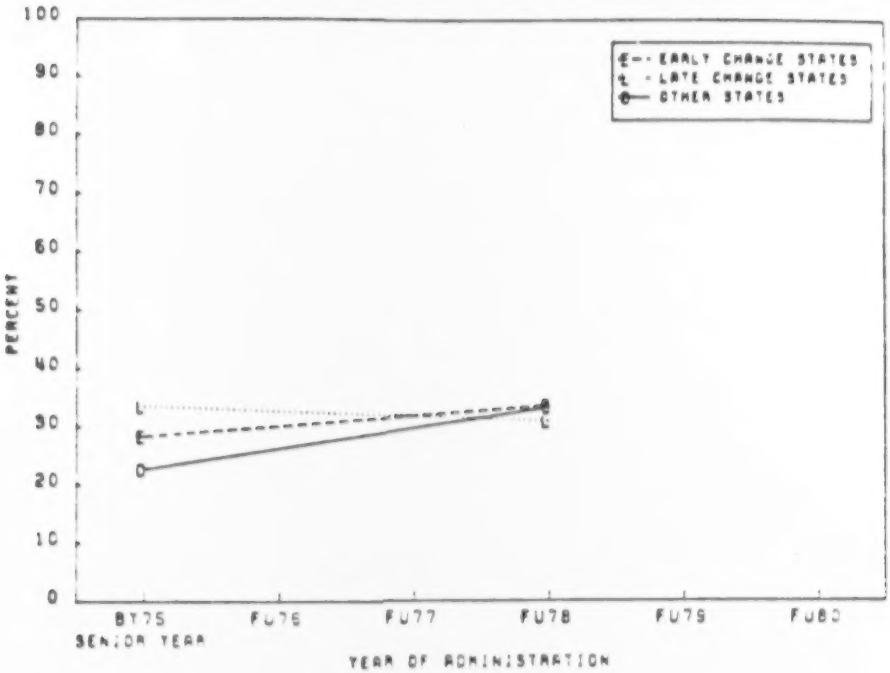


Figure A-15

MONTHLY MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1978



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MONTHLY MARIJUANA PREVALENCE
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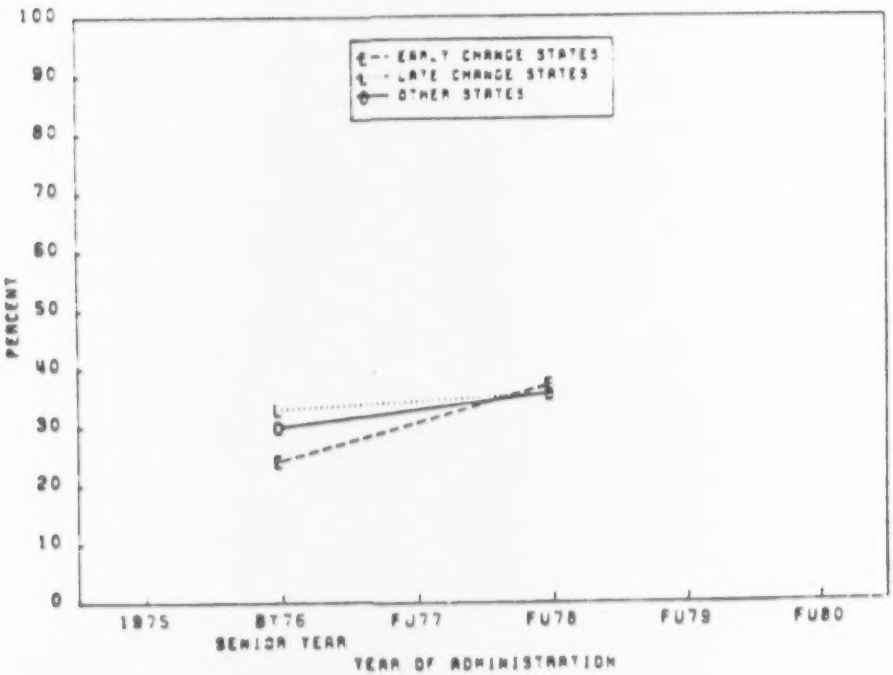

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Figure A-17

DAILY MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1978

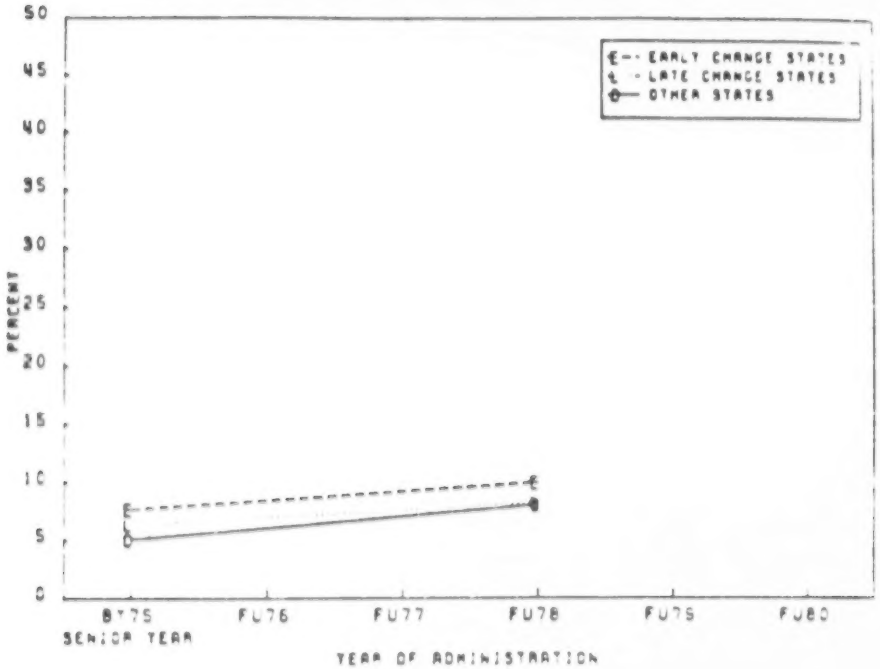


Figure A-18

DAILY MARIJUANA PREVALENCE
BASE YEAR 1976 THROUGH FOLLOW-UP 1978

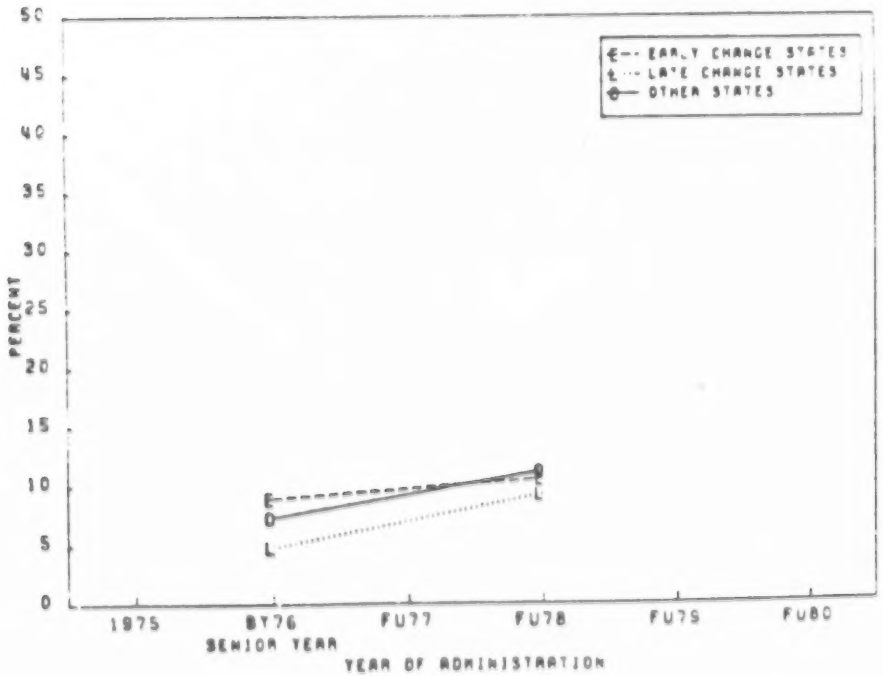
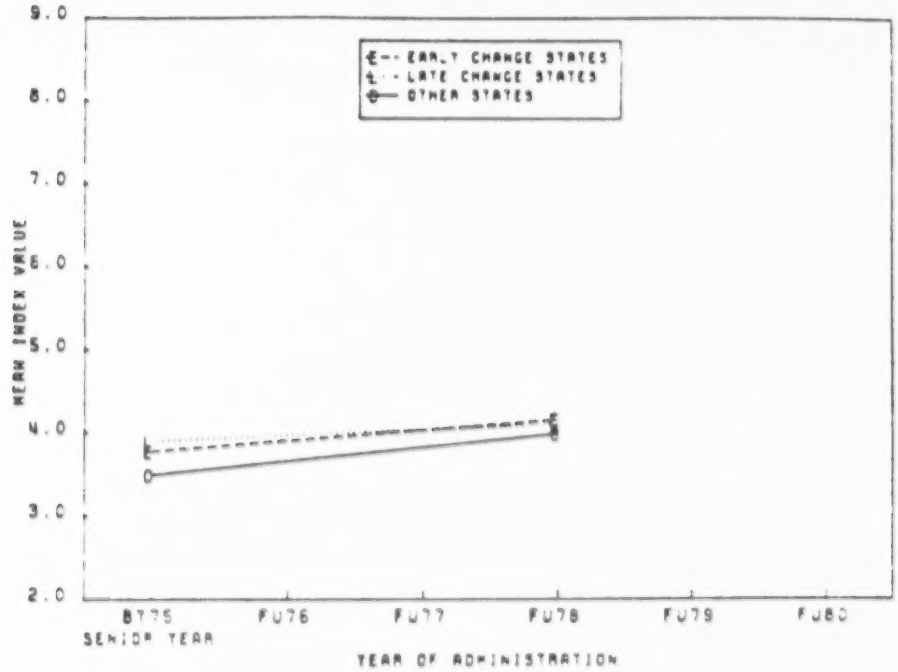


Figure A-19

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
BASE YEAR 1975 THROUGH FOLLOW-UP 1978



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MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
BASE YEAR 1976 THROUGH FOLLOW-UP 1978

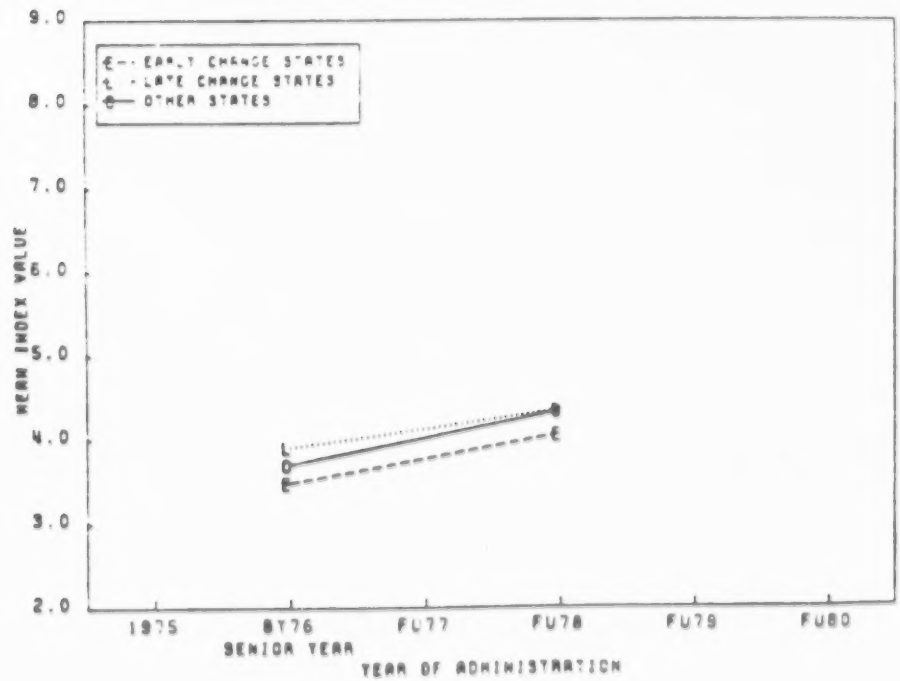

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Figure A-21

LIFETIME MARIJUANA PREVALENCE
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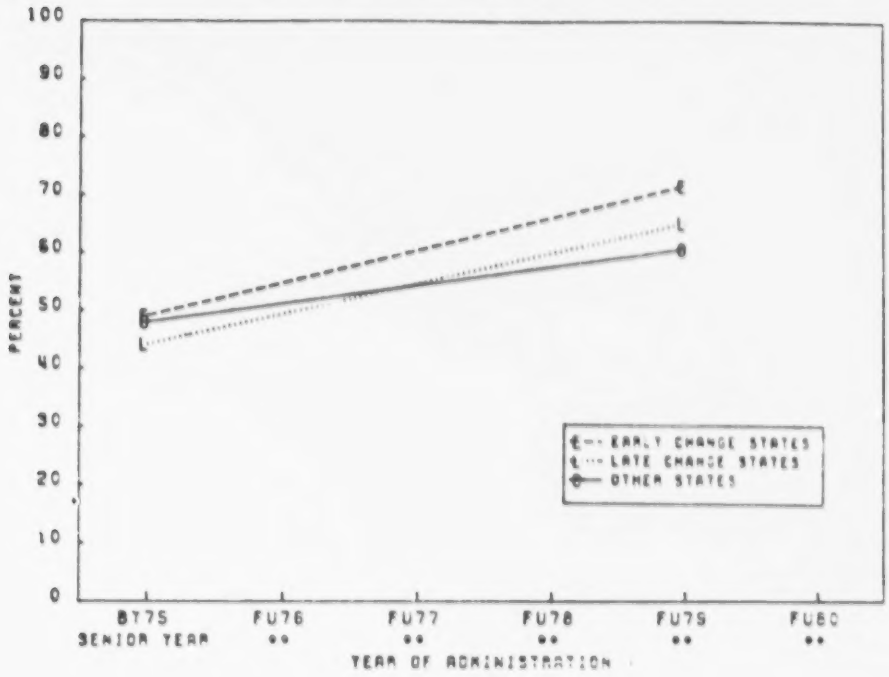

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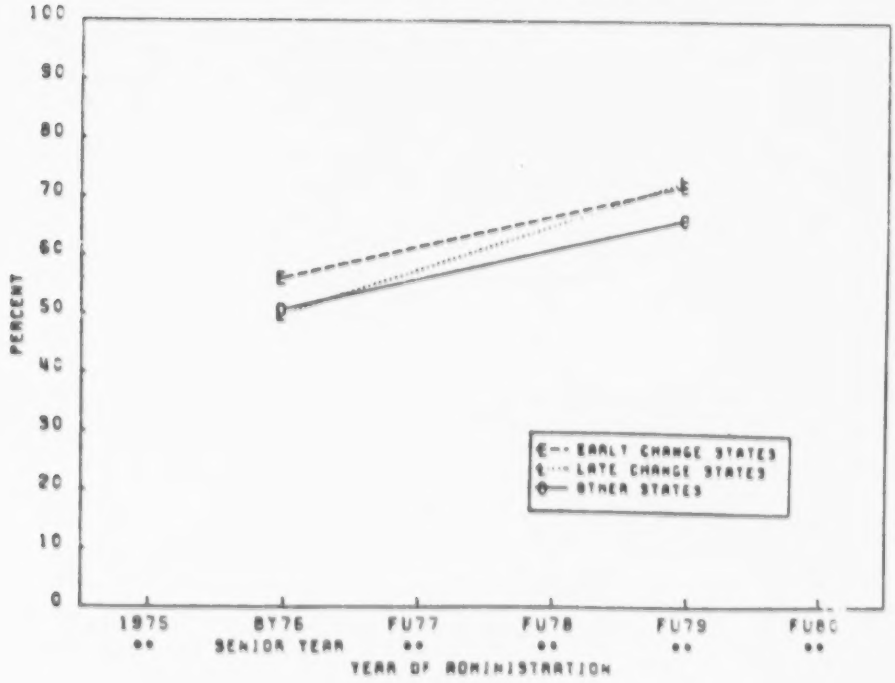

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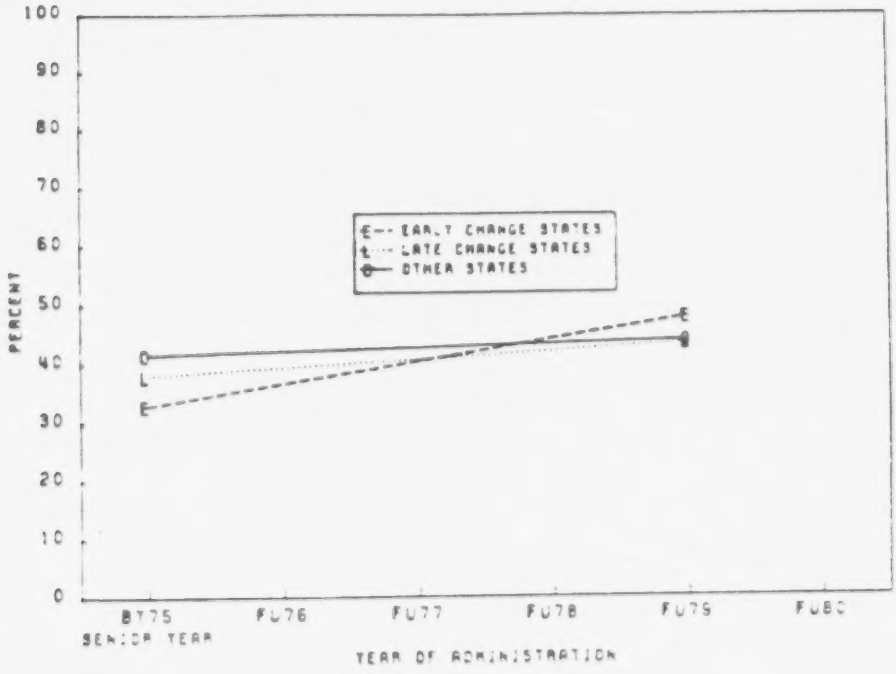
ANNUAL MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1979



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ANNUAL MARIJUANA PREVALENCE
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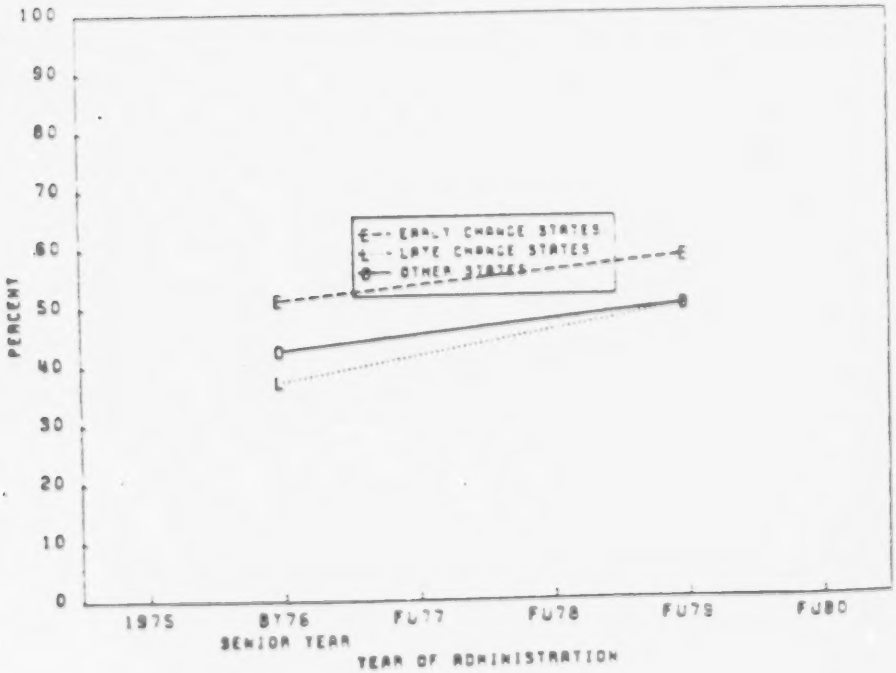

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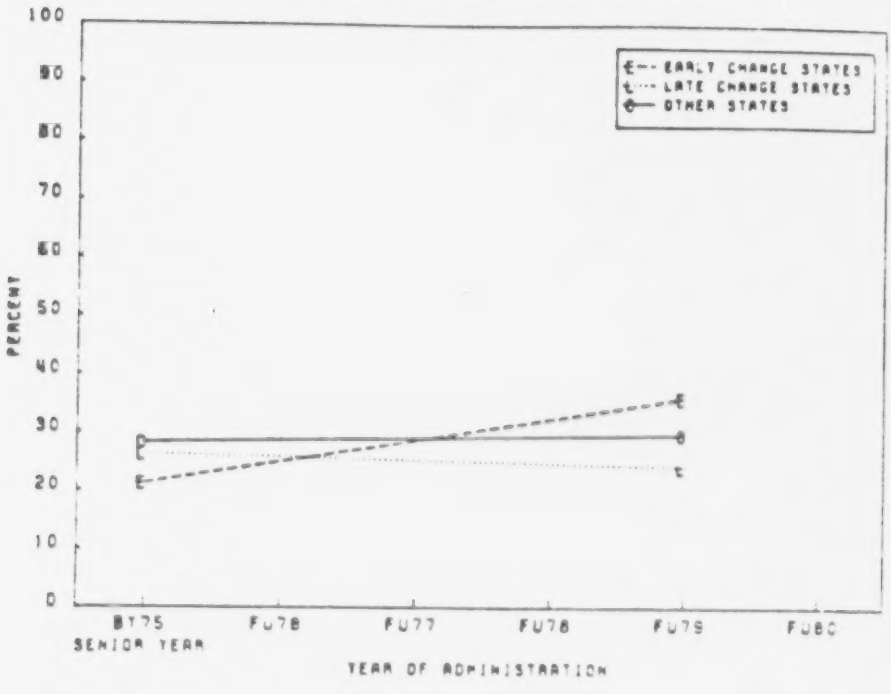
MONTHLY MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1979



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MONTHLY MARIJUANA PREVALENCE
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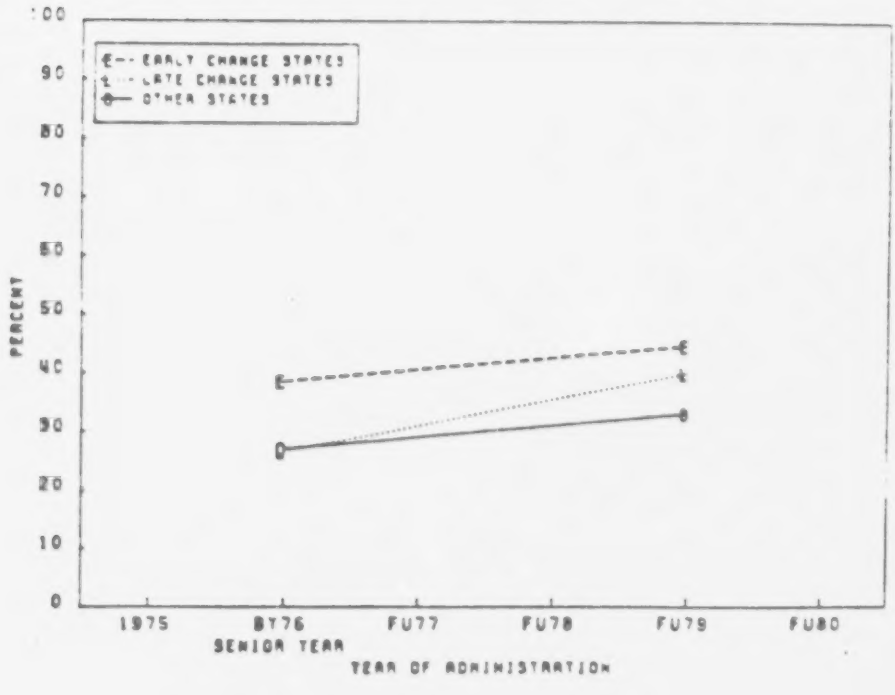

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DAILY MARIJUANA PREVALENCE
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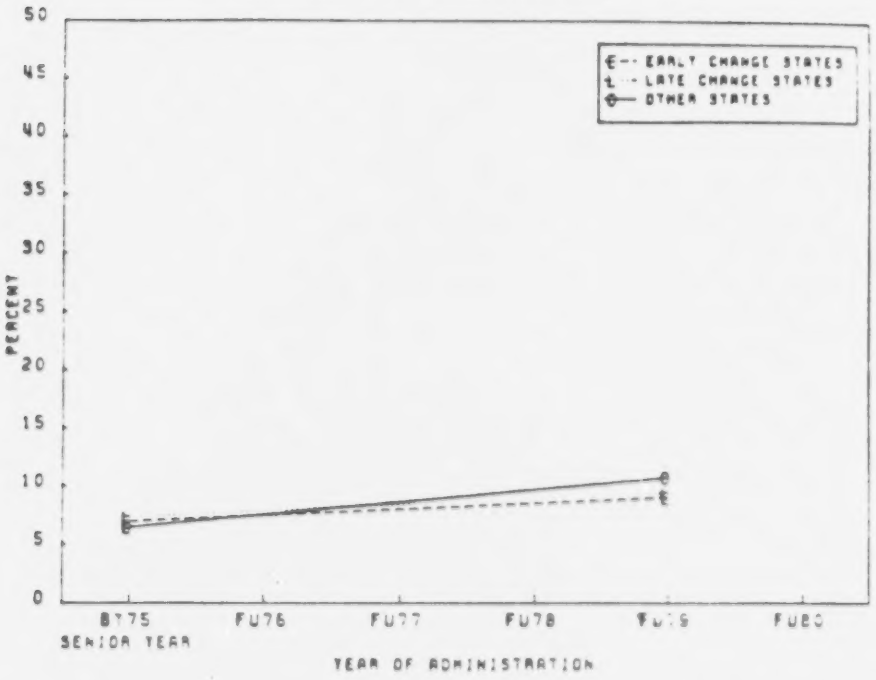

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DAILY MARIJUANA PREVALENCE
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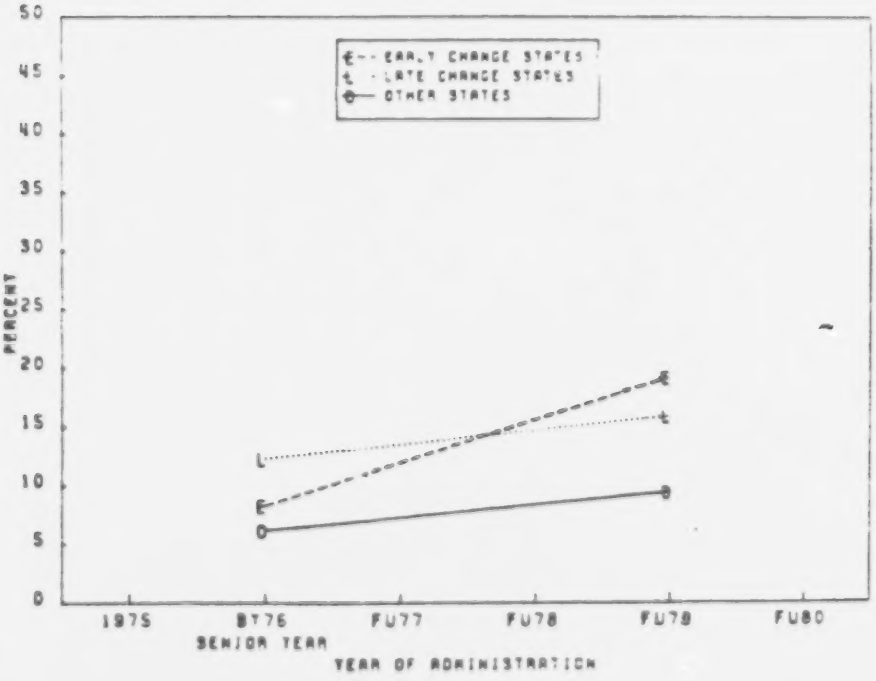

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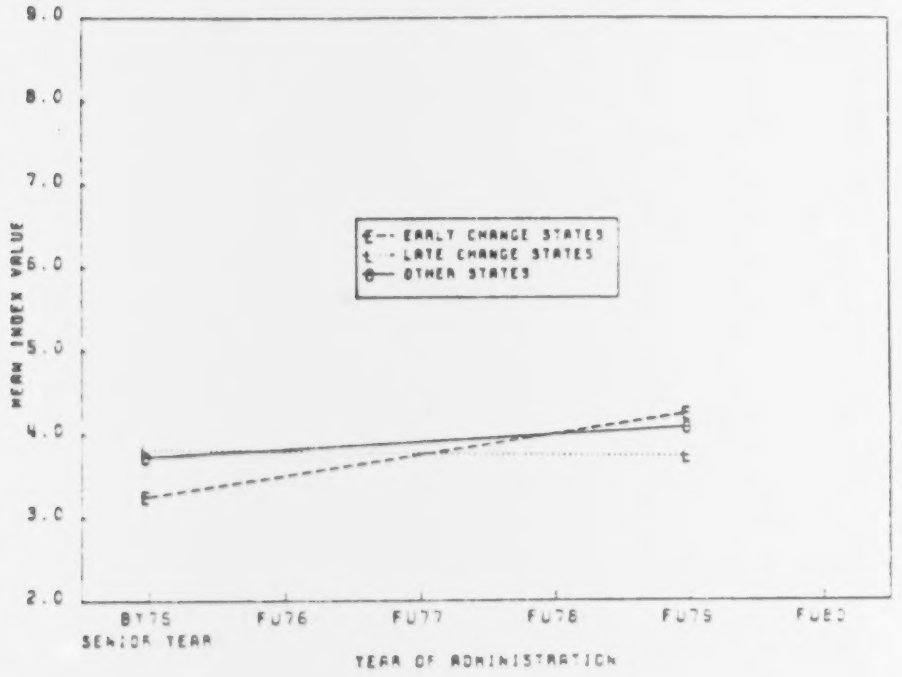
MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
BASE YEAR 1975 THROUGH FOLLOW-UP 1979



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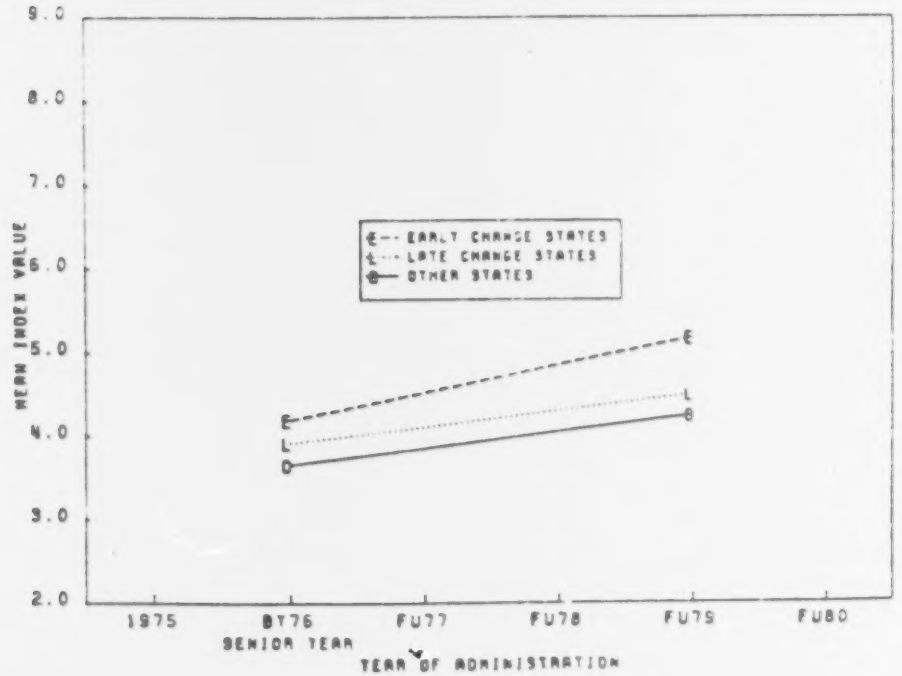

Figure A-31

LIFETIME MARIJUANA PREVALENCE
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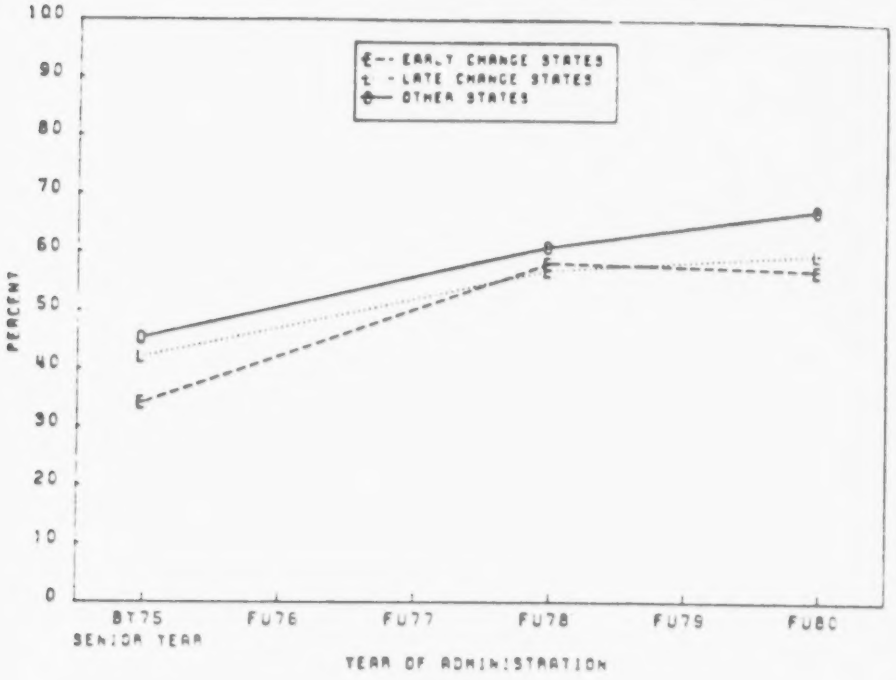

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LIFETIME MARIJUANA PREVALENCE
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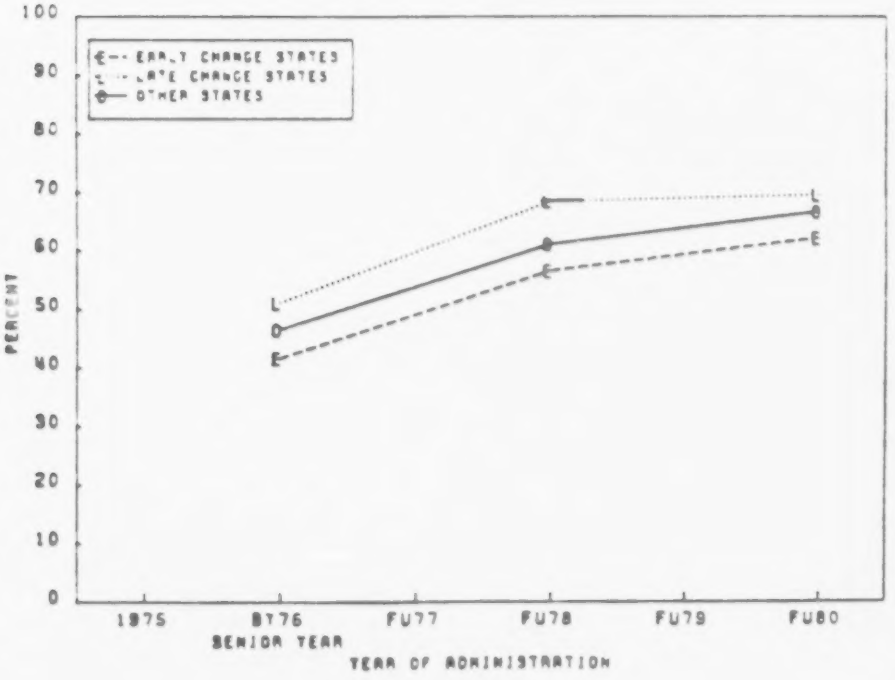

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Figure A-33

ANNUAL MARIJUANA PREVALENCE
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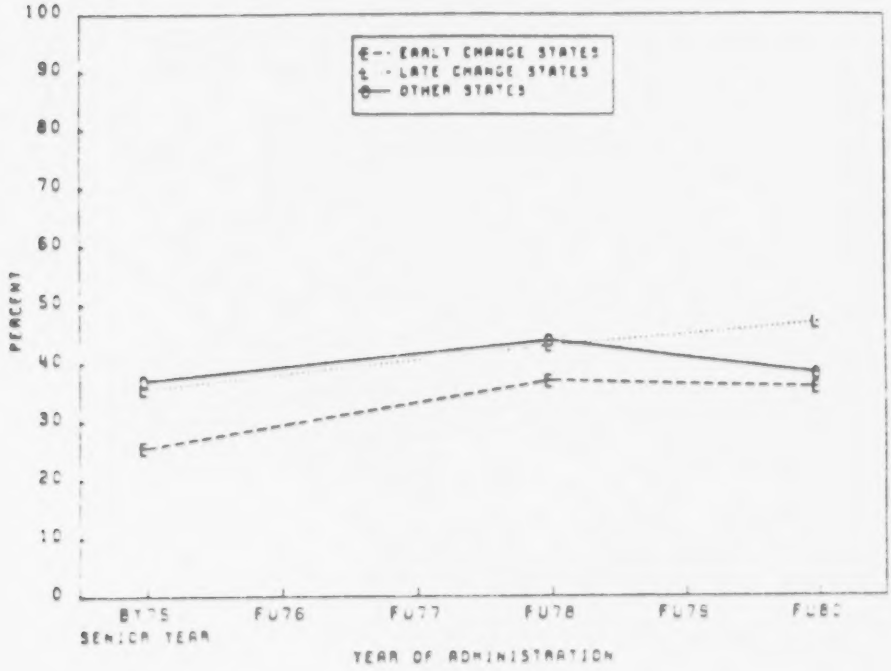

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ANNUAL MARIJUANA PREVALENCE
BASE YEAR 1976 THROUGH FOLLOW-UP 1980

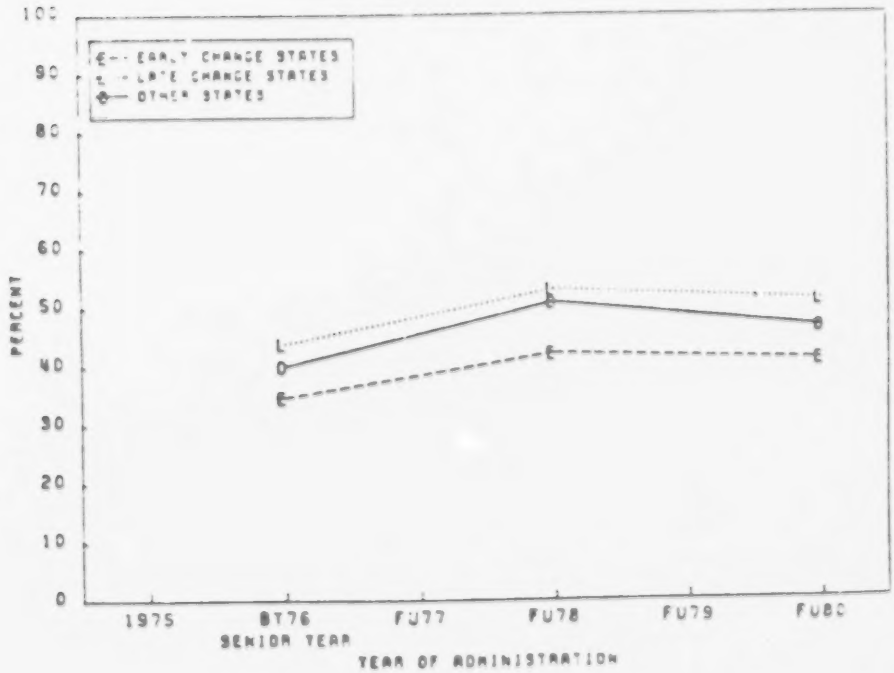

Figure A-35

MONTHLY MARIJUANA PREVALENCE
BASE YEAR 1975 THROUGH FOLLOW-UP 1980

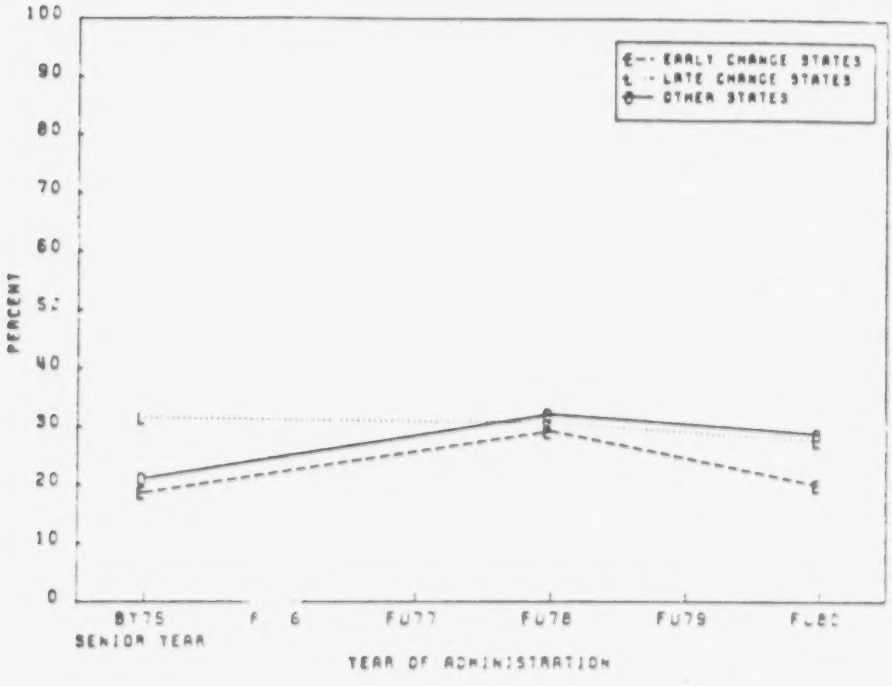

Figure A-36

MONTHLY MARIJUANA PREVALENCE
BASE YEAR 1976 THROUGH FOLLOW-UP 1980

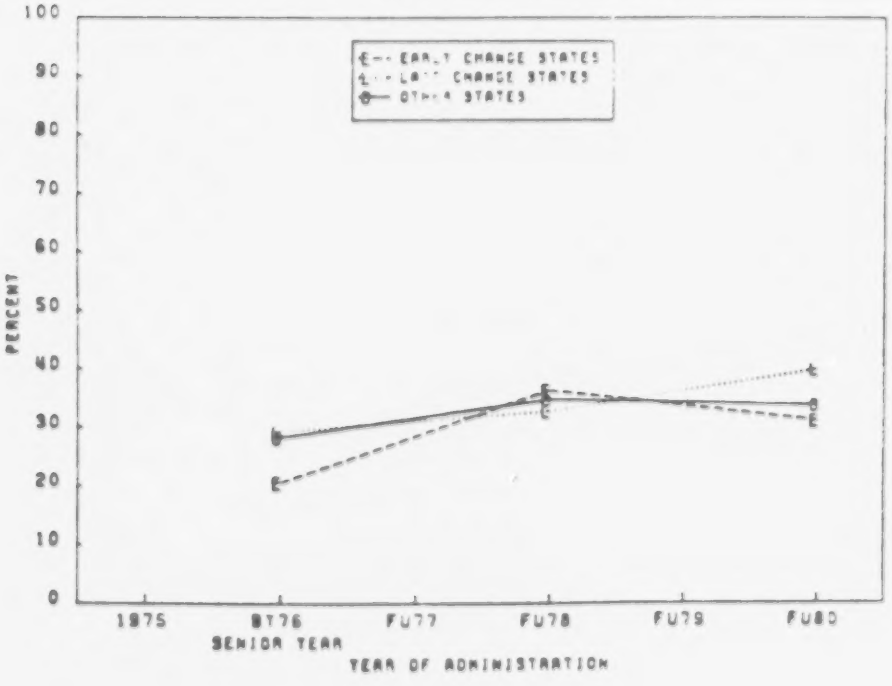

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Figure A-37

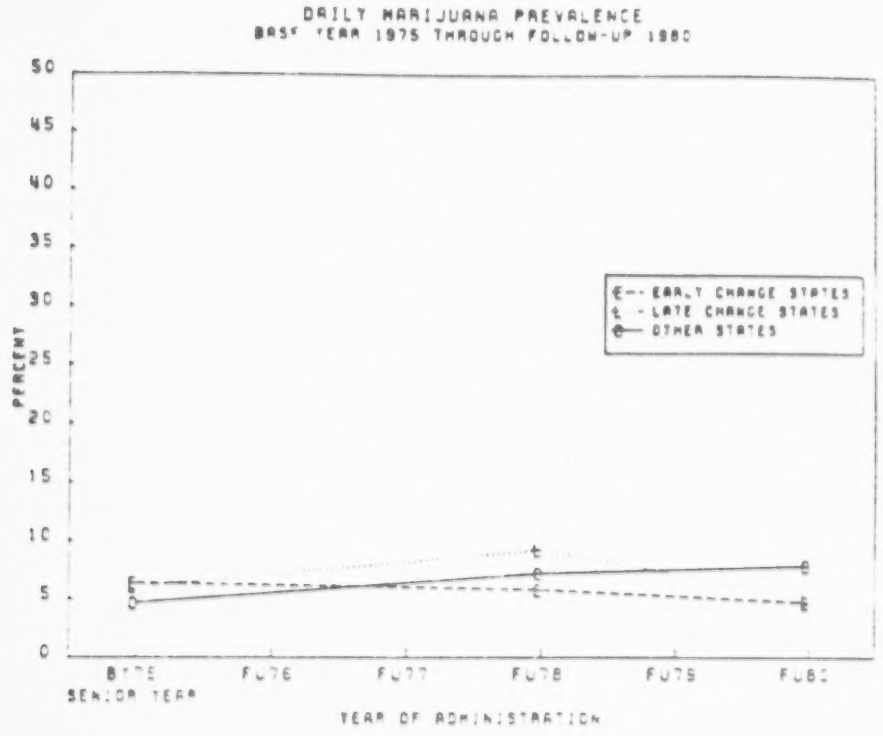


Figure A-38

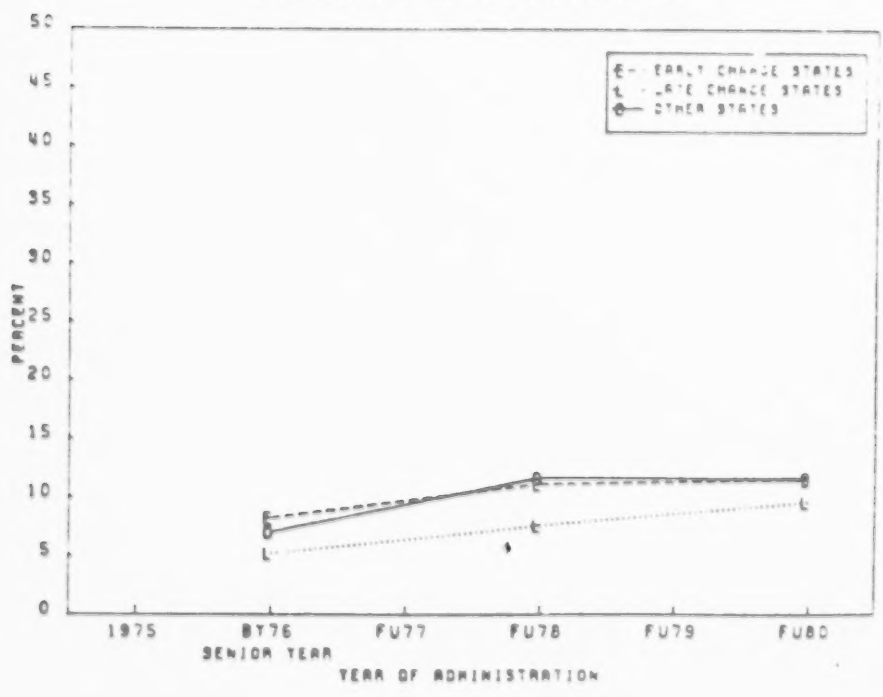


Figure A-39

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
BASE YEAR 1975 THROUGH FOLLOW-UP 1980

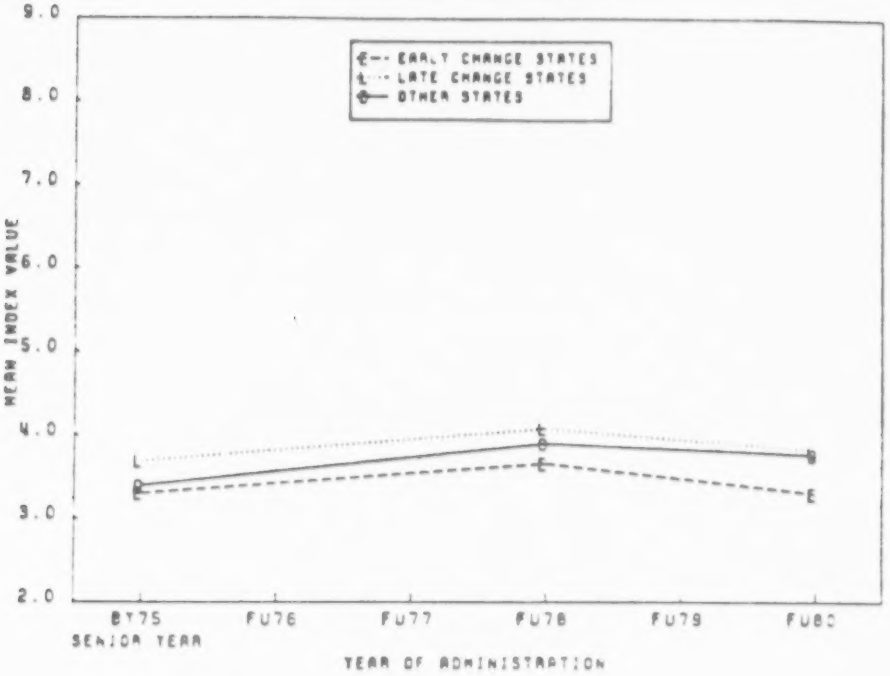
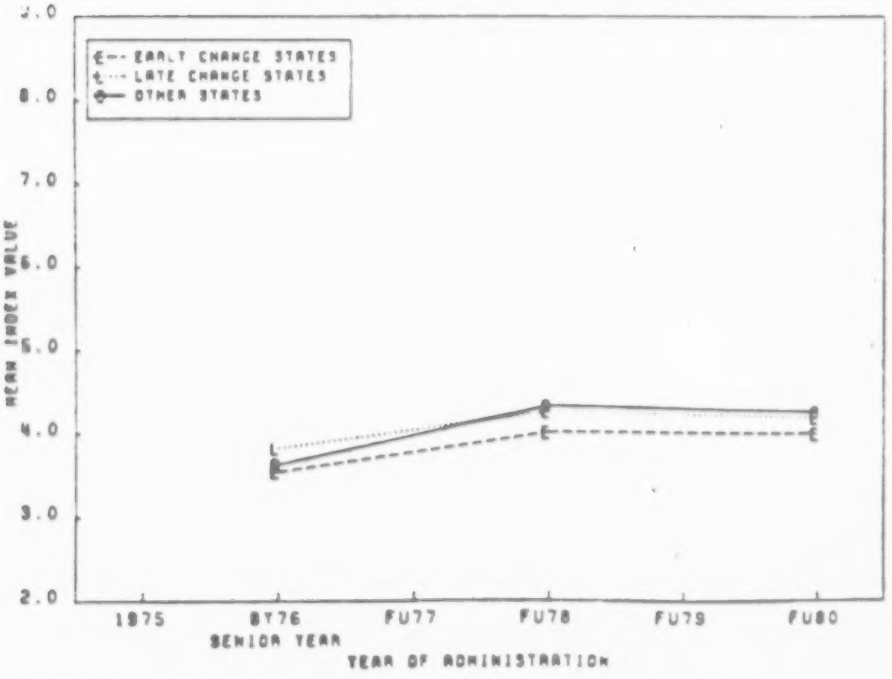


Figure A-40

MARIJUANA FREQUENCY INDEX (2 TO 11 SCALE)
BASE YEAR 1976 THROUGH FOLLOW-UP 1980



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APPENDIX B

Estimation of Effects of Law Change

Although the results presented in the main results sections seem to be very clear and unambiguous, we also used a technique to do some estimating of effects as opposed to simple hypothesis-testing, which is the procedure used in the main body of the report. Specifically, we estimated the effects of being in an early-change state or a late-change state on the change in marijuana use by high school seniors, compared to the other states. The estimating technique used is weighted least squares as implemented in the GENCAT computer program (Landis et al., 1976). Estimates of the effects were obtained, using the matched pairs of schools, for all five one-year intervals for each of five measures of marijuana use (lifetime, annual, monthly, and daily prevalences and a frequency index). These estimated effects are the best estimates of the effect on marijuana use by seniors of being in either an early-or a late-change state (compared to a non-change state), taking into account the size of schools, the amount of correlation between school mean usage measures from one year to the next, and the sampling variance of the dependent variable. If the estimated effect on annual prevalence of being in an early-change state were, e.g., - .015, this would be interpreted as saying that the prevalence of use in the early-change states would be estimated to have increased by one and one-half percentage points more than the control states. (For the frequency index, the interpretation would be a relative increase of .015 points on that scale.) These estimates differ from simple mean differences because they take into account the factors mentioned above.

Although this procedure could have produced different findings, in fact the results, displayed in Table B-1, parallel very closely those presented earlier in Tables 3 through 7. Because the basis of statistical significance is a very large number of cases, many of the one-year changes are nominally "statistically significant." However, as observed earlier in the Results section, the significant changes do not appear to exhibit a pattern that could be interpreted as effects due to the changes in law. For example, although there is a significant increase between 1977 and 1978 on the frequency index for the late-change states, the same measure shows a significant decrease in those states in the very next time interval (1978-1979). And no such effect (a temporary increase followed immediately by a decrease) appears in the early-change states. As another example of a non-systematic effect, the frequency index shows a "significant" increase between 1978 and 1979 in the early-change states. One might be tempted to interpret this as a delayed effect of the law change, but in the next interval (1979-1980), there is a significant decrease. The pattern of findings appears to us to be best explained as one of relatively small random fluctuations, indicating no systematic effect on use resulting from the marijuana law change.

Table B.1

Effects on Marijuana Use of Being in Law-change States
for Five One-year Intervals

Change Between	Group	N Schools	N Students	Prevalence				Frequency Index
				Lifetime	Annual	Monthly	Daily	
1975-1976	Early Change	28	3196	-.025**	.015*	.003	.010	.029
	Late Change	5	693	.004	.023	.008	.009	.085
1976-1977	Early Change	31	4266	.004	.007	.002	-.004	.031
	Late Change	7	810	-.017	-.000	.007	-.017*	-.119
1977-1978	Early Change	31	3868	-.008	-.016**	-.006	-.010	-.081*
	Late Change	12	1711	.005	.017*	.038**	.030**	.224***
1978-1979	Early Change	10	1548	.015*	.039***	.021*	.025***	.215***
	Late Change	7	794	.001	-.011	.026*	-.017	-.209**
1979-1980	Early Change	12	1386	-.021*	-.042***	-.025*	-.011	-.143*
	Late Change	4	111	-.019	-.017	-.024	.017	.061

Notes:
* p < .05
** p < .01
*** p < .001

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